

REPORT ON INQUIRIES

MADE BY

THE INSPECTORS OF IRISH FISHERIES

INTO

AN ALLEGED DECREASE IN THE SUPPLY OF FISH OFF CERTAIN
PARTS OF THE COAST OF IRELAND,

AND

THE ALLEGED EFFECTS THEREON BY TRAWLING AND OTHER
MODES OF FISHING,

TO HIS EXCELLENCY THE LORD LIEUTENANT OF IRELAND.

Presented to both Houses of Parliament by Command of Her Majesty.



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THE INSPECTORS OF IRISH FISHERIES

1870

An Alleged Decrease in the supply of Fish off certain parts of the Coast of Ireland, and the effects thereon by Trawling and other modes of Fishing.

TO HIS EXCELLENCY CHARLES STEWART MARQUESS OF LONDONDERRY, K.G., LORD LIEUTENANT-GENERAL AND GENERAL GOVERNOR OF IRELAND.

MAY IT PLEASE YOUR EXCELLENCY,

Allegations having been made from time to time that a decrease in the supply of fish off certain parts of the coast of Ireland had taken place, and that consequently the fishing industry had greatly declined, we held a series of meetings round Ireland, commencing at Newcastle, county Down, on the 30th July, 1866, and terminating at Brandon Bay on the 21st February, 1867, to inquire into the subject, and the state of the fisheries generally, the present modes of fishing carried on, including trawling, and the necessity for making any by-laws, rules or regulations prohibiting them, or of relaxing, repealing, or altering any such in force.

The inquiries were held at the following places and times, viz:—

At Newcastle, co. Down on the	30th July, 1866, in reference to the fisheries of Dundrum Bay.
At Greenport, "	31st " " " " Belfast Lough.
At Hollywood, "	2nd August, 1866, " " " " " "
At Carrickfergus, co. Antrim,	3rd " " " " " " "
At Ballycastle, "	5th " " " " " " Coast, co. Antrim.
At Portrush, "	8th " " " " " " " "
At Moville, co. Donegal,	9th " " " " " " Coast, co. Donegal.
At Cullinst, "	10th " " " " " " " "
At Malin Head, "	11th " " " " " " " "
At Mullaghmore, co. Sligo,	31st " " " " " " Donegal Bay.
At Donegal, co. Donegal,	2nd September, 1866, " " " " " "
At Killybegs, "	4th " " " " " " " "
At Toekin, "	6th " " " " " " " "
At Portlaoise, "	8th " " " " " " Donegal Coast.
At Inniscree, "	10th " " " " " " " "
At Buncbeg, "	13th " " " " " " " "
At Innishobbin, "	14th " " " " " " " "
At Duncannon, "	15th " " " " " " " "
At Malroy, "	16th " " " " " " Downey's Bay.
At Rathmullen, "	18th " " " " " " Lough Swilly.
At Buncrana, "	20th " " " " " " " "
At Sligo, co. Sligo,	9th & 11th Oct., 1866, " " " " Sligo Bay & Coast.
At Inniscree, "	12th " " " " " " Killybegs Bay.
At Rathfriland, co. Mayo,	15th " " " " " " Lough Bay.
At Buncrana, "	5th November, 1866, " " " " Buncrana Bay.
At Buncrana, co. Cork,	6th " " " " " " " "
At Castletown Bere, co. Cork,	8th " " " " " " Kenmare Bay.
At Kenmare, co. Kerry,	11th " " " " " " Dingle Bay.
At Dingle, "	13th " " " " " " Westford Coast.
At Westford, co. Wexford,	28th January, 1867, " " " " Dublin Bay.
At Kinsale, co. Dublin,	31st " " " " " " East Coast.
At Howth, "	2nd February, 1867, " " " " " "
At Balbriggan, "	6th " " " " " " " "
At Clough Head, co. Louth,	7th " " " " " " Carrlingford Lough.
At Carrlingford, "	9th " " " " " " Waterford Harbour.
At Passage East, co. Waterford,	15th " " " " " " " Coast.
At Dunmore East, "	17th " " " " " " Brandon Bay.
At Claghane, co. Kerry,	21st " " " " " " " "

The evidence taken at the several inquiries is submitted herewith.

Our inquiries commenced at Newcastle, in the county Down, in reference to the fisheries of Dundrum Bay. Our Report will proceed in regular order from that round the coast by the north and west.

DUNDRUM BAY.

Newcastle, Co.
Down.

AT NEWCASTLE.—The evidence produced was confined to the fisherman who follow line and net fishing. There was no appearance on behalf of trawlers. There was almost a general consensus of opinion that the capture of fish had seriously diminished; that there was abundance of fish to be had forty years ago, but that the decline was going on gradually for the last twenty years. There were about the same number of boats engaged in fishing as formerly, but their average earnings had fallen off more than one-half. The falling-off in the quantity of fish was attributed by most of the witnesses to trawling being carried on outside, on banks between St. John's Point and Carlingford, during February, March, and April, where and when, it is alleged, the fish spawn. One witness was clear "that about twenty-seven years ago the line-fishing for haddock, cod, and whiting was very successful, there being fish in abundance, and the fishermen able to earn 3s. to 5s. a-day, and that they often earned 8s.—the average was about 4s. a-day—but that the fishing had seriously diminished, though the fishermen were persevering and worked as fully as they did twenty-seven years ago." In addition to the failure in the line fishing, "the herring fishing," he stated, "had been a complete failure within the last few years. He believed that trawling was perhaps one of the great reasons of the deficiency, the trawling being carried on on a bank that runs opposite Carlingford south of Ardglass, where the fleet of trawlers work in the spawning season in about twenty-eight or thirty fathoms of water, and up to thirty-five, and that that was the principal place where the herrings, whiting, and codfished in the latter end of the season. He was clearly of opinion that if trawling was not confined to very deep water, the result would be that in ten years' time fishing would disappear altogether from the coast. He also considered that all trawling should be restricted in the months of March and April, as it was then the fish are in shoals along the banks."

A witness who had eighteen years' experience of the Bay, stated that "in his opinion there were as much fish as ever outside in the offing, but that the men had not proper boats to follow the fishing constantly out in the deep water, though the open yawls often went outside in the winter season, principally for haddock, and the absence of proper boats arose from the want of harbour accommodation."

A pier and harbour were constructed at this place some years ago, at a cost of over £10,000, but was carried away by a storm and heavy sea. The Grand Jury of the County declined to repair it, and objected to money being expended on its maintenance, as a charge on the county rates, and it became a ruin.

From the evidence, it would appear that the decline in the fishing commenced about from fourteen to twenty-seven years ago, and, unless the theory of the witnesses, that this decrease is the effect of trawling outside the bay, in the Channel, be correct, it cannot be said that it is in consequence of trawling inside the bay, as that mode of fishing has been prohibited in the bay and along the coast inside of a line drawn from Cranfield Point to St. John's Point since 1851, now thirty-eight years ago.

There are no means at the disposal of the Fishery Board of definitely ascertaining whether, at different seasons, there may not be large quantities of fish throughout the bay. One thing we should at least hope to look for by the interdiction of a productive mode of fishing like trawling in a particular bay, would be, an increase in the quantity of fish in the place having rest for over thirty years; but, instead of this, the fishing has been gradually declining in this bay from a few years after the interdiction took place.

The suggestions of the witnesses that trawling should be prohibited at such a distance from the land to prevent the extinction of the fisheries, clearly intimated that it should be prohibited a long way beyond the Territorial limit.

BELFAST LOUGH.

Greenisport, Co.
Down.

AT GROOMSPORT.—The substance of the evidence was, that thirty-five years ago fish was to be had in such plenty, that, with one day's fishing, as many fish might be seen coming into the harbour as would take a horse and cart to carry away, and the fishermen could make 15s. each for a night's work. "The fishing has been declining year after year, and not one-tenth taken now. The decrease began about three years ago. There was an abundance of fish fifty years ago. Turbot, soles, britt, and cod. There were seven or eight trawlers then at

"Groomsport, now there are only three; they trawl with yaws. The fishing has been declining about twelve or fourteen years, since the trawlers were allowed to come into the upper parts of the Lough. The decrease is attributed to trawling there, and in the winter when the fish are spawning, and great destruction of small fish takes place. There were eighteen boats fishing from Groomsport, three of them being trawlers; the rest line fishing boats. The fishermen complain also of the injury done to the fishing grounds by dredges depositing the mud inside the lough instead of taking it outside, and also of the steamers throwing out cinders, clinkers, &c., when passing up and down. They suggest that trawling should be prohibited above Gray Point in the County Down and Carrickfergus in the County Antrim, and in winter. All the witnesses examined at Groomsport were trawlers.

At HOLLYWOOD.—Only a very small fishing place at the best of times, evidence was given, that "twenty-four families used to get a partial living by fishing, and now there are only four or five families partially engaged at, and only one person solely employed by it. Twelve years ago as many as seven to eight dozen of plaice of from 2 to 3 lbs. each could be taken by two persons in a couple of hours wading into the water. No such thing now. A trawling vessel, three and a half years ago, could get as much as 30 stone of fish in a day which would sell at 1s. 2d. a stone. It would not take now more than 12 stone. The fishermen used to take cod, hake, mullet, and flat fish." Fishing from Hollywood according to the evidence is now a thing of the past. Mussels, which formed a staple article of food for the people, used also to be gathered in large quantities, also whelks, but they are now so reduced that it is hardly worth going after them. The decrease in the mussel and whelks is attributed to persons raking them up from the bottom, and exporting them to the great injury of the mussel beds. The decline in the fish is generally attributed to the trawlers killing large quantities of small fish which are "pitched overboard," and working in the upper parts of the Lough, which was exhausting the fishing. This took place principally since the trawlers were allowed to come inside the Lough.

Hollywood, Co.
Down.

At CARRICKFERGUS.—On the opposite side of the Lough, no line fishermen appeared at the inquiry, and the evidence was therefore confined to that given by the men who follow trawling. One witness was trawling over forty years, and stated that "the quantity of fish taken by the trawlers in the Lough was as much as ever it was—that it had not decreased, but that the fish was rather smaller that year than formerly in regard to weight. This decrease in size was only remarked that season. It affected the price, for it was by weight all fish were now sold, instead of by the score. They got a better price even in this way for large than for small fish. The price, wholesale, was then about 1s. 3d. a stone for the small, and 2s. 3d. to 2s. 6d. for the large fish." Statements made by the fishermen at Groomsport, as to the Carrickfergus trawlers taking such quantities of small fish, that they were sold at 5d. a stone, and also of their constantly breaking the by-law prohibiting trawling between six o'clock in the evening, and six o'clock in the morning, during the months of December, January, and February, were contradicted.

Carrickfergus, Co.
Antrim.

In 1878 there were sixteen trawlers at Carrickfergus, now there were only seven employing three to four men in each. "Since the by-law prohibiting trawling in the Lough above a line from Carrickfergus to Rockport was repealed, and trawling allowed all over the Lough, the fishing was much the same as ever, and no 'odds' in quantity."

"The fishermen made as much earnings as before—on an average about 10s. to 15s. a week." One witness stated, that, he believed "there was the same quantity caught now that there was fourteen or fifteen years ago; that he never remembered fish more plenty than they were last fall, till there came a gale of easterly wind that took them away out of the Lough altogether (771), and in reply to the question (778) "Don't you get larger numbers of small fish in the shallow water, more than anywhere else?" He answered "We do not, we get good fish in the shallow water. There is a hard bank and in the latter end of August and September and up to November we get better fish there than in any other place; but I think there is an end of it now, from the way they are throwing mud and stuff on it. I wrought there and made plenty of money where they are emptying the stuff now. It is very injurious to the fishery. I was under the impression they took it outside Black Head, but I noticed the other day that they threw it overboard between this and the bank."

Another witness who had been eighteen years trawling, said "the fish were as plentiful as ever he remembered them, and he worked at trawling when the by-law prohibiting it in the upper parts of the Lough was in force." He admitted, that in those times they had to violate the law to make money, and that the Groomsport men did it as well, for he met them many a night in the Lough. "There were as much fish now as then, but the quality was not quite as good. The decrease in the number of men employed was accounted for by the men getting more lucrative work—that the majority of men in the North of Ireland looked on the fishing as a mean business, and some of them would rather go and gather rags, as they considered the fishing business low" (814). Other witnesses corroborated these statements.

It will be seen what variance there is between the testimony given by the fishermen on the County Down side of the Lough and those on the County Antrim side. So conflicting is it, that nothing but a series of practical and systematic observations could determine the facts as to the state of the fisheries of the Lough. Reliable statistics as to the fish caught, we have none. We have, however, the fact, that on both sides of the Lough the number of boats and men have seriously diminished.

The county Antrim fishermen attribute this to the men getting more lucrative employment: the county Down fishermen to the scarcity of fish.

We believe the county Down men are correct in their statements, that there has been a serious decrease in the capture of fish by them. Whether this diminution in the supply extends over the whole Lough, or whether there is, as was alleged by the county Antrim people, a plentiful supply, in places which perhaps the former do not frequent, is almost impossible, on merely sworn inquiries like those held, to determine.

In 1854 a by-law was made by the then Commissioners of Fisheries, prohibiting trawling in the Lough *within a line drawn from Grey Point, in County Down, to Kilroot Point, in the County Antrim.*

In 1857 another by-law was made, *prohibiting it inside or within a line from Carrickfergus, in County Antrim, to Rockport, in County Down, and from the 1st December to 1st April.* The effect of this was to allow the Trawlers to fish, for about one mile and a half, further into the Lough, and prohibiting it in the whole Lough between 1st December and 1st April. The By-law of 1854 does not appear to have ever been repealed; but that of 1857 seems to have been the one observed.

These by-laws remained in force till November, 1869, when they were repealed after a sworn inquiry, and, in lieu thereof, it was prohibited to trawl in the part of the Lough named in the by-law of 1857, viz.: *within a line from Carrickfergus to Rockport, between six o'clock in the evening and six o'clock in the morning during December, January, and February.* The effect of this by-law was to permit trawling to be carried on all over the Lough at all seasons, save at night time during the three months—December, January, and February.

It was the relaxation of the by-law of 1857 in 1869, to which the County Down fishermen referred as having been injurious to the fisheries of the Lough. The County Antrim fishermen on the opposite side of the Lough were, however, as strong in their testimony, that it had not led to any decrease in the quantity of fish taken. They, however, admitted that when the by-law of 1857 was in force, not only they, but the County Down fishermen, constantly violated it, and they could not help doing so, "if they wanted to make money."

There is no authority round the Lough competent to enforce a strict observance of such a restriction as that made in that by-law. If such a force existed, or, if we could have seen any chance of such a law being enforced, and, that, while it was in operation, we had the means of making observations as to the quantity of fish, not only inside, but outside such protected area, from time to time, we would have had no hesitation in re-enacting the law of 1857.

To make such a prohibition, however, without having the means to enforce it, and without being able to make any observations as to its effect, would not, in our opinion, be wise legislation. It should be observed that during the period between 1854, when the first prohibition was enacted, and 1869, when restrictions as to place or area were removed, no observations were made, nor were any statistics collected. It was only on the sworn evidence, taken previously to making the by-law of 1869, that the prohibition, so long in existence, had done no good and was only hampering industry, that the by-law of 1857 was repealed.

COUNTY ANTRIM COAST.

AT BALLYCASTLE.—The evidence showed a decrease in the quantity of fish taken and a diminution of the numbers of boats and men employed. Lines and nets are the modes of fishing. No trawling. Though some evidence was given as to the decrease of fish off Rathlin Island, a witness stated "he supposed the fish were as plenty as ever, but they had no boats fit to go to the deep water, and no harbour for large boats, which they could not save, having to 'rid' a place on the beach for their present boats, and if the boats were too large, they could not get them into safety, but if they had a harbour they would then be fit to go to sea."

There were only about eight men on the island now depending on fishing, though all the population fish sometimes and farm other times.

Between the island and the mainland and along the coast, it was stated that fish of every description were getting scarce and had greatly fallen off for the last four years. "Nothing like the quantity of fish to be had now as compared with twenty-five or thirty years ago. Wages of 30s. a week could then be easily made, independently of the herring fishing. Now, for the last two or three years, the fishermen would not make 6s. a week." The herrings, of which there used to be large captures in former days—one witness stating that "one season about twenty-five years ago he had made £50 at the herrings alone"—do not come in close to the shore that they could get at them with their draft nets, the mode of fishing for herrings practised on that coast—that they see them outside as they were formerly, but farther out—any amount of them, but that they had neither the boats nor proper nets for them. There was no water at the bar for getting in with any size of a boat—not a foot at low water, and a boat carrying a ton could not get in."

No reason can be assigned for this falling off in the supply. It cannot be attributed to trawling, for that mode of fishing is not practised on that part of the coast.

AT PORTSTEWART.—Trawling is carried on in the bay as well as line fishing. The trawl, used, principally in open yawls by the Portstewart fishermen, is, what is generally known as the "otter trawl." It was stated that more small and immature fish were taken with the "beam" trawl in one tide than would be taken in four tides with the "otter," because the mesh of the latter was larger. As much as two baskets full of immature fish, each basket weighing about two stonnes, taken at one haul, might be thrown overboard as not fit for the market.

There were forty-nine boats constantly engaged in fishing in the locality by trawling, lines and nets, and for the last five or six years the fishing of all kinds had fallen off. This was attributed to trawling, and the use of draft or seine nets inside Lough Foyle, by which immense quantities of small fish were taken—one witness stating he "had taken as much as two tons in one haul of a net." This, however, was contradicted at the inquiry at Moville, when evidence was given that the use of draft nets in Lough Foyle, by means of which small fish were taken as described, was unknown.

Whatever decrease there may be, if any, in the supply of fish in this bay, we cannot come to the conclusion that it is caused by the use of the trawl net in these small boats, nor from trawling in Lough Foyle, which can be carried on there only with the consent of the owners of the fisheries within the Lough. To prohibit it, even as an experiment, outside the Lough, in the bay, would inflict an injury on a poor, but very deserving class of fishermen at Portstewart, while, without careful observations, as before described, the effect of such a prohibition could not be ascertained. Portstewart Bay is more of an open sea than a bay.

COUNTY DONEGAL COAST.

AT MOVILLE.—The evidence was very strong that there was "no decrease in the fish—they were as plentiful as ever. The modes of fishing are by trawling and lines. Last winter there was plenty of cod fishing close to the headlands." Fish were something more plentiful the last two or three years—all kinds—both hook and trawl fish, and the last three years were as good as sixteen years ago. The great fishing banks lie about twenty miles off the coast;

"called the Torr Bank, north of Inishtrahall, and Hamptons Bank, where line fishing only is carried on, and where, when the weather permits, all kinds of fish, except herring, are to be got. The weather has been more stormy and hoisterous of late years than formerly, and fishermen are afraid to go out, their boats being too small."

Trawling in Lough Foyle is not considered to be injurious to the spawning fish, as "when the flat fish spawn, the trawlers cannot go in with their boats, a great extent of the Lough being very shallow. The time the fish are spawning in January and February, is the time fish are scarcest with the fishermen. It has been carried on in the Lough for twenty-five years, and there never has been any protection of spawning fish, and they are as plentiful as ever. No spawna was ever seen in the trawl net, and very few small fish taken. If the net got full of dirt, and the meshes got closed, they would be taken, but always thrown out alive. At the line fishing, nine miles off the land, a boat can get seven, eight, or nine dozen of cod. No scarcity either of flat fish; the other trawls, which they use, were getting from five to six, and ten and twelve stones at a time."

A thoroughly practical fisherman, engaged at it for many years, gave such important evidence that we quote a good deal of it at length. With respect to any decrease in the inshore fishing, which is meant to be two or three miles off the land, he stated, that "it was owing to the change of seasons, the winters and summers being more stormy than formerly, the fry, which is the food of the fish, has not taken the same course as in former years, and don't come as close to the land as they used to do. The fish, in consequence, do not come in as close to the shore as they did at that time, but they were as plenty as twenty or thirty years ago; the general course of the fish is changed. They are not to be got as plentiful inshore. Fishermen must go farther out. About a year before, he went out with a schooner and let go anchor outside of Tory Island in sixty fathoms of water, and caught cod as fast as they could pull them in. This year, in April, he went again off Tory Island and got becalmed off Malin Head, and got the best of fish there. If a smack of sixty or seventy tons, which could carry a crew of about twenty men, could be got, it would be the best mode of promoting the fisheries round that coast;—the more lines down at one time, the more fish will gather round. The best time for line fishing was from Christmas up to May, and he believed that this heavy fishing never leaves, within sixty miles of the coast, and that cod and herrings would be caught. In the spring of the year, the herrings go away to the north-east, and the fish follow them off the land, the cod follows the herring, and, if the fishermen on the coast could get vessels large enough, and a number of them to join together, they would make better fishing than they ever made; the fish are as plenty, and they are a better price when caught in February or March;—the boats are too small. It is a risk to a man's life to go in one of them. He thinks that turbot under a certain size should be prohibited from being kept in possession."

These statements were corroborated by other fishermen.

Ouldoff, Co.
Donegal.

At OULDOFF.—Similar evidence was given. "The fish were not so plentiful inshore, but out in the deep water as much so as ever, and if the boats were able to go out, they would get any amount of fish. Their boats, however, must make the shore every night. The weather was very coarse the last three winters, but any man that had good boats could make a very good thing of it. What the fishermen complain of was the want of proper boats and gear, and the former could not be kept until a suitable pier was built in the place. Evidence was given that money would be forthcoming for such purpose if this were done. One gentleman stated in evidence that he would put as much into the enterprise as he could afford, if there was a proper pier in the place, and, if this were not done, there would be no investment of capital as was proposed, and the result would be that the fishermen, as such, would die out, and would strive to support themselves on their small patches of land."

The pier erected at this place is not sufficient for the purpose.

Malin Head, Co.
Donegal.

At MALIN HEAD.—The same description of evidence was given,—"inshore fishing decreasing for a number of years, but when the boats can go out far enough, plenty of fish to be had. The boats go out twenty to forty miles when weather permits, and they take in the fish with six lines as fast as they can be

"pulled in. The small boats they fish with have to make home before night, but if they had large vessels that could stand out, plenty of fish could be got. A year ago nine of the fishermen went off to the far banks, and took three and a half dozen to each man. It was sunrise when they went out, and it was near one o'clock when they got to the banks, and had soon to return, as it soon becomes misty and dark."

As will be seen by the substance of the evidence given, the fishermen carry on both trawling and line fishing on several parts of this coast, and there is no complaint of the scarcity of fish outside. In fact their only complaint being that they had not a class of craft sufficient to follow a very productive fishing, which exists with as much advantage to themselves and the public as they might do.

At PORTNOO.—Six witnesses were examined, one of them being the Recorder of Cork. All testified to the abundance of fish off shore some miles out, but of late years a decrease in the in-shore fishing. Some of the witnesses were thirty and forty years fishing from Portnoo, and on that part of the coast. All complained of the want of proper boats to follow the fish,—those in use being now quite too small,—and the want of harbour accommodation. The modes of fishing are lines, nets, and lobster pots—no trawling. A few quotations from the evidence are given:—"When he began fishing, thirty years ago, there was a good supply of fish, now none at all. They are keeping out a greater distance than formerly—formerly they were closer to the shore. Formerly there was a little more fish off the coast than now. There is no way of taking them now, and if a storm arises we cannot go out to take them. We would lose our lives by going out. The fish do, most certainly, keep further out now than they used to do. Has seen fifteen or sixteen dozen of cod caught in one day with a boat. Cod further out than they used to be, but what is the use of that, for we have no way of going out to them. No way of going out or in. Gear lost; not able to go out to save them. Cod banks about twelve miles out to sea. Any amount of fish out in the bay, but they are a good distance out—at least ten miles. None of the boats are sufficiently good to go that distance into the bay. The boats here are not capable of fishing properly. The men cannot use bigger boats in consequence of want of shelter. Would have a large boat and nets, and the means of fishing, if there was a proper harbour. We could catch plenty of fish if we had proper accommodation. We would be all right if the pier was restored, so as to be able to get to it in all weathers. It would be a great boon to us poor fishermen, for when we are pulling hard for three or four hours before we come to land, and then have to pull up our boats on the beach so far, we are so weak that sometimes we are not able to walk. It also injures our boats. The stones of the old pier, lying as they are in the harbour, increase the difficulties of landing. It creates a wash, and makes the sea very rough. When the pier was built it extended into the water about 150 feet. Six feet of the pier remains there still."

The Recorder of Cork stated, "that when he was a boy, his father had a small vessel of about twelve tons, and took very large quantities of cod, ling, and other fish of that kind, about twelve miles out to sea. Some of it was disposed of fresh, and such as could not be sold was salted and served for food during the winter for half the district, and there were also at that time several other small boats, from eight to twelve tons burden, fishing round the coast. There are none of them now. The present boats are totally unfit to go out, and they have no gear. The men have no materials for capturing turbot. Some of them have taken turbot of sixteen pounds to eighteen pounds weight with their long lines. There are plenty of turbot along the coast. The sea is fully supplied with fish, and there is very good trawling ground, but the cost of transit is so great that it does not pay. Cost of transit and want of shelter and harbour accommodation, and especially, the want of a pier, prevent the development of the fishing industry."

The coastguard officer stated there were seventeen boats registered, all third-class, and sixty-one men partially employed at fishing:—that "there was no accommodation at all in the harbour for them:—great difficulty in landing:—that he had seen the fishermen in danger frequently when landing. On one or two occasions he had been himself prepared to shove out with a boat in order to save men when running the chance of coming in. In bad weather it was exceedingly dangerous."

Portnoo,
Co. Donegal.

Inshore,
Co. Donegal.

At INNISBOO (RUTLAND).—Five witnesses were examined. There was a general consensus of opinion here, that "the fish were as plenty as ever, even more plentiful than when they began to fish. Cod, ling, flukes, conger, mackerel, herrings, lobsters. The fish were easy to be caught if they had any means of catching them. No means now. Had lines but lost them." One witness stating that "fish were very plenty if we had any way to catch them," and "There is no date since I remember I ever saw such a quantity of fish as was here yesterday evening. I don't think I saw so many in the last ten years.' "If they had larger boats they would not be afraid to go anywhere. Could fish night and day, and take plenty of fish. 'We have sometimes gone ten miles off the land with our hand lines.' 'Sometimes five or six men in a boat would get 3 or 4 dozen of cod, and may be 20 dozen glasson or perhaps 30, or they might load a boat.' Plenty of mackerel off the coast at present. "If good boats, and proper gear, they could catch plenty—as much as ever. "Believes there is any amount of herrings in the bay at present." A witness stated—"Last year I was out a couple of days myself, and our boat caught 35 dozen of cod, ling, and glasson, mixed, in one day. In fact, the fish were so plenty that they were nearly jumping into the boat. It was about eight miles W.N.W. of Arran.' 'There is a pier on the west side of the island (Arran), but it is not properly made. You could not bring a boat alongside. The pier would want to be lengthened, and an angle turned on it to the north-east.' 'If any sort of a pier was made, and that the men had gear, they would fish and take plenty of fish, because the men are inclined to follow up the fishing very much, but they have no gear at all.' Plenty of fish lying about the coast. The men have not been able to go after the fish when they shifted their ground, and kept further out from the coast. 'The boats were too small, and they could not venture out ten or twelve miles after the fish, for, even if the weather was fine when they went out, it might not remain so, and they might not be able to get back again.' 'The men here would take as much fish as ever they could catch, and load their boats with them if they had proper means of catching them.'—This was the master of a 170-ton schooner. A magistrate of the county, and resident in the locality, stated—"We cannot say to what extent the fisheries would be developed if the men had the means of sending the fish away. I believe they would be developed to a much greater degree than people have any idea of.' 'I believe there is a vast fortune to be made by the people of the Rosses out of the sea around the coast here. I believe they could make a living out of the sea when they could not make much comparatively out of the land.'"

This gentleman also urged the great importance of an extension of telegraphic communication, and the probability that, "if it were extended to the locality, it would yield a considerable revenue, and be a very great benefit to the country. "The population of the district was 7,000. There were several coast-guard stations within it, courts of justice, markets, fairs, and a number of mercantile houses, all of which would support the telegraph."

Inshore,
Co. Donegal.

At BUNZOE.—All the witnesses concurred that the fish were very plentiful, but keeping further out. A Scotch crew last year fished off Gola, and took a valuable quantity of fish. Several witnesses from Tory Island testified to the fish being farther out, and their boats could not reach them. The following is a portion of their evidence:—"From February to May found cod and ling very plenty from fifteen to twenty miles off the land. "There are banks all about the island—cod and ling banks; the great difficulty is the distance the fish are out—boats too small; if they had a good tug-boat could supply fish to the whole County Donegal. They sometimes leave in the morning to go out fishing about three hours before day—it takes about six hours to reach the fishing ground—cannot spend more than two or three hours until they have to make for the land again, and it may be ten o'clock at night when home. It takes twelve to fourteen hours to go to the fishing ground, and to come back again. Only about two to four hours fishing, and would take about four and a half dozen to five dozen of cod mostly to each man—eight men in each boat; there is plenty of fish for all if they could go out to them—would need a tug-boat. If they had a good steamer and a good harbour to go to, they would be independent men on the island, because in every month of the year can get plenty of fish—cod, ling, and greyhound. "One day I was in a boat with five other men, and we caught thirty-five

"dozen and four fish in one load, and thirty dozen and nine fish in the second load, in one day to my own boat, and had to go twelve miles for two loads; and only the wind was in our favour and a nice breeze from the east, we could 'only have one load;' was only about an hour and three quarters killing the last load. 'If we had a large steamer to put our loads on we would call ourselves independent men.' The same witness says—'I think every day of the year we could get fish out on that bank from ten to twenty miles. Four men could load the boats handy, but then four men would not be able to pull the boats out and take them back—it would kill them. That is the reason we have to take eight men with us. We have to get pitch pine oars that will not break, for if we broke our oars, we have nothing for it but to pull our eyes over our heads and look to the shore.' There was £60 worth of fish caught in one day off Tory. There is plenty of fish for every man."

Off Tory Island there appears to be abundance of fish of that class—cod and ling. If a curing station were on the island, and the people taught to cure in a proper manner, a ready sale would be found for them. Tory Island.

At INNISBOFFIN.—The witnesses testified to "plenty of fish—herrings, mackerel, greyloids, lobsters—but insufficiency of boats and gear, and the want of landing places on the island and a pier on the mainland. They have to haul their boats up on the island 80 yards, and on the mainland 220 yards. The difficulty the men have in unloading and bringing the fish ashore, and in hauling up their boats over a rough and stony beach, is so great that the men are frequently deterred from fishing at all." The coastguard officer stated that there were no facilities whatever for landing at low water. "When the boats come in with fish it has to be thrown overboard, and brought in by the people, and the boats hauled up the beach, or else horses with baskets have to wade in alongside the boats, and take the fish ashore."

Five-sixths of the fish landed for the islanders is landed at Magheraourty.

At DUNFANAGHY.—The same story was told about the scarcity of fish near the coast. "Plenty of cod, ling, and haddock formerly, and up to ten years ago. They were then to be had five miles off the land, but now they keep further out to sea, and the boats used, principally 'currachs,' or 'carrachs,' could not go so far to follow them. In consequence, fishing has been very bad for some years. The weather has been more boisterous and stormy of late years than formerly; fishing is carried on by long lines during the winter and summer. No trawling, except by a small yacht from Londonderry, belonging to a gentleman. 'It was not worth going out last winter for cod and ling—where we would get boat-loads some time ago, we get very few now. Any time the weather was good we went out as usual, but the fish has fallen away.' 'The herrings do not come into the bay now so plenty, and that is the reason the other fish are failing.' 'The improvement of the pier at Portlough is what is required more than anything else in this locality; there is a very bad entrance to it. It is impossible to get in, in bad weather; there is a very narrow entrance, and it is dry at low water round the pier.' 'There is a pier at Downey's Bay, but it is perfectly useless.' 'It is not built in the proper place. Downey's Bay has got very much worse within the last few years, and it is very dangerous now in any kind of bad weather.' Dunfanaghy, Co. Donegal.

At Downey's Bay, Mulroy.—The same description of evidence. Fish scarce round the coast—plenty formerly. "Many a time I put ten dozen, cod and ling and haddock, in a small currach in a day, and sometimes nine dozen and sometimes five dozen, and when I would get too much to put into the boat I would tow them after me.' 'The fish are not lying on the same ground.' 'I remember at one time I got twenty dozen of haddock at one shot, and many a time twenty and ten and twelve dozen.' The people fish on the same ground as formerly—outside of Downey's, about two miles north of Sheshaven, for cod and ling, and up to twelve miles off—would get in a good day's fishing, thirty years ago, from five to seven dozen in a currach, and, last winter, only got a dozen to a dozen and a half in a day, and, the winter before, the same. About thirty years ago there was a good deal of herrings on the coast: then they got less, and were not as plenty for nine or ten years after that, and now for the last four or five years, since they got the relief nets—before that there was hardly a net on the coast. Cod, ling. Downey's Bay, Co. Donegal.

"turbot, flukes, and soles scarcer—far rougher weather now than formerly—
 "the fish may be as plentiful, but they are not so close into the land—should
 "go further off to sea, but cannot with the craft they have. 'Soles are about
 "the same since I commenced fishing; the general take is from seven to eight
 "pair—about 300 hooks. My opinion is that the trawling has injured them
 "very much.' It is carried on by two private parties—trawling about two
 "months. 'I have seen eight to nine pair of soles taken by a trawler in one
 "haul, and three dozen plaice.' The trawl down about two hours—has
 "seen taken in a day by Lord Leitrim's trawl 'fifteen or sixteen pair of sole,'
 "and 'three dozen of flukes.' "We get every bit as much sole as we did
 "at any time, but of turbot we are not getting so many."

This trawler worked only one season. The other trawler has worked every season in the summer for five or six years.

Some of the witnesses complained of the want of accommodation for hauling up their boats—no place of safety—liable to be carried away at any time.
 "The pier is not sufficient to protect the boats in bad weather. You could
 "not keep them anchored there—no ropes or chains would hold a boat with
 "the run of the sea.' That is inside the pier—it is not safe, and 'part of
 "the pier is useless for the want of clearing away the rocks.' A slip at the
 "foot of the pier, to accommodate the boats landing, is required. 'It is with
 "difficulty we can haul the boats up at all, and we require eight or nine men
 "to do it.'"

Along this part of the coast from Portnoo to Sheephaven, of which we have given a short summary of the principal evidence, little or no trawling has been carried on save that mentioned in Donfanaghy—two small yachts, one of them having only trawled one summer, and the other for only five or six summers—and the fishing inshore, or within a few miles of the coast, where abundance of cod, ling, haddock, flukes, herrings, &c., were formerly to be had, has apparently fallen off most materially. According to the evidence, the fish are in deep water outside, and can be had when weather permits a boat to go out. The class of boats in use along the coast is quite unfit to do so, and until proper harbour accommodation can be supplied, there is no likelihood of a better class being obtained.

We would refer on this subject particularly to the evidence taken at Portnoo and Bunbeg, and the remarkably large quantities of cod and ling that are often captured off Tory Island, which might be made a useful depot for the curing of fish, if a curing station were erected, and the people instructed in the art of curing. The employment of a steamer would also be necessary for the safety and shelter of the fishing boats when engaged fishing so many miles off the land.

LOUGH SWILLY, COUNTY DONEGAL.

Lough Swilly.

We held inquiries at Rathmullen and Buncrana, at which a vast amount of evidence was taken.

Since then, an Act of Parliament has passed, empowering Your Excellency in Council to prohibit trawling, if you should so think fit, in places where we may have come to the conclusion that it was not expedient to do so, on the application of two-thirds of the owners of registered fishing boats in the locality.

Since holding these inquiries a petition in conformity with that Act was received by us, and we held further inquiries, which might be said to be practically exhaustive, so far as oral testimony on such a matter can go, the result of which with the evidence in full, has been made the subject of a special Report to your Excellency in Council, and to which we beg to refer.

So far, we have dealt with the whole north, part of the east and north-east, and the north-west coasts, commencing at Newcastle, in the county Down, round to the Bay of Donegal, and, with the exception of Dandrum Bay, in which trawling has been prohibited now for over thirty-seven years, Belfast Lough where it had been prohibited for twelve years, and where it is now prohibited during December January and February at night, and Lough Swilly in a great portion of which it had been prohibited for 25 years, no restrictions had been placed on trawling.

In the whole of that part of the coast very little trawling is carried on in the different bays. Where the trawlers generally work is outside in the deep water. The decrease in the supply of fish in what may be called the "in-shore" waters, if there be really a scarcity of fish, cannot therefore have been caused, in our opinion, by trawling. We must look for other causes, which can only be ascertained by a series of carefully conducted practical and scientific observations.

We now proceed down the west coast, commencing at Donegal Bay.

DONEGAL BAY.

Donegal Bay.

We held inquiries round this Bay at Mullaghmore, Donegal, Killybegs, and Teelin. Mullaghmore, on the co. Sligo side, and Teelin Harbour, on the co. Donegal, may be said to be the outward heads of the bay. The distance between these two points is about twelve miles.

At MULLAGHMORE.—The evidence was of the most conflicting and contradictory character, and quite different from that we received on other parts of the coast, as to the decrease in the quantity of fish on the "in-shore" grounds. The line men allege that a great diminution has taken place on the outside grounds where they fished formerly—that they now do not go as far out as they did twenty years ago, as the fish failed there, and came into the inner water. Some admitted, that they might have got as much fish on the old ground if they had gone out. They attributed the decrease to trawling. The cod fishing was nothing to them compared with the sole, plaice, and dabs, on which they used to earn 5s. or 6s. formerly before breakfast, by leaving out their lines at night. Sometimes perhaps they would take thirteen or fourteen pair—"that was not half a mile off the shore in the clean ground." They could not kill as much sole now there as formerly—"for the fifteen or sixteen dozen they need to catch, they would have but one now."

Mullaghmore,
Co. Sligo.

The trawlers never worked at this place where there used to be such good fishing—that was at a place called Roonkeeragh—and when line men gave up fishing at that place there were not many soles to be caught. It was "fished out." One witness stated that "there was a decrease in the fish taken with the lines—the steamers and heavy trawlers were the cause of the scarcity." He himself had a small trawler, but fished also with lines and nets. He said that "they did not go out to the deep water for the last ten years as much as they used to do formerly, and the reason was, because when they would go out, they would follow the fish as far as they could find them, but at different times when they took shots out in the deep they could get no fish, and so would not go out there any more."

A fish buyer, who had contracts with some of the trawlers for six years belonging to this place, of which there were about seven of small tonnage, stated that "the decrease in capture was so large, that he had thrown up the contracts, and this decrease was attributed to the large trawlers that work in the deep sea, and have killed the fish, and injured the small trawlers."

The whole complaint seemed to be against the large trawlers which had been sent over to fish in the bay. One of these large trawlers having it was stated, taken £60 worth of fish in one scraping—"one of these large trawlers took 200 pair of sole in one day, and they went to different places with the fish to disguise the quantity taken—they were killing such a quantity of fish they were afraid to let it be known." This witness stated, that "three large trawlers were sent from England last year, and this year there were eleven sailing and two steam trawlers, and that he saw large quantities of fish sent off from Bundoran Station—nine to eleven boxes in one day. He was certain there was plenty of fish in the bay, but he would not approve of trawling within the heads—the men had no way to fish for them, for the fish were gone outside the bay, the opinion being there would be as many fish as ever in the bay, only for the trawlers which destroyed large quantities of immature fish and fry." Another witness, a trawler of the locality, stated he "did not find any diminution in the quantity of fish—and that that was the best year he ever had. He fished also with lines and nets, and that the last winter's line fishing, though not so good as the former one, was as good as a few years before, and that they never had a herring fishing last season that continued

"so long—that he did not remember the herrings to have remained so steady "in the bay for thirty-eight years as they did last year."

From the evidence, we were of opinion, that, so far as the capture by the Mullaghmore fishermen was concerned, the fishing had decreased materially from former years, but whether that was the consequence of the falling off in the supply, or the want of perseverance in following the fish, as formerly, into deeper water could not be determined.

Donegal.

AT DONEGAL.—The complaints were chiefly directed against the steam trawling, which had latterly been carried on in the locality. The witnesses stated that until these trawlers came in no substantial difference in the fishing was observed. Since then there was a considerable decrease, and this was attributed to trawling, which, it was alleged, frightened the fish out of the bay and the fishing for the last two seasons was a failure.

The trawlers came in to the bay in May of last year. Our inquiry was held in September, 1886—but this year (1886) they came in greater numbers.

One witness stated that "in about five or six days, before they came, he caught eighteen dozen and four glasson but could not kill a fish of the same sort since. He supported himself and family by long lines and that season he had not made five shillings. It was not quite so bad the season before, but it was not a good season either. As regards herring fishing, he stated, that before the trawlers came he had caught in one night's fishing 11,000 herrings, but, since then, had not killed 1,000 for a night's fishing—and he attributed it to the trawlers tearing up the ground that the fish used to rest in—it frightened the fish out of the bay; there was no sprat fishing in the bay since the trawlers came. He admitted that a few men might have made more last winter than they did other years." Another witness stated that "last year was a good year for long line fishing—that he saw a man shooting his lines off the Point in the latter end of July and taking seven dozen—but that there was not one to be caught then—that the fishermen were not able to shoot their lines, because if they did the trawlers would drag them away. With respect to the herrings, "there were more killed in the bay last year than for years before, but the trawlers were not in the bay at the time." Another witness, who complained very much of the decrease of the fish in the bay, and threatened, that if the trawlers were not banished by fair means, the fishermen would banish them by foul, stated that in Inver Bay, which is a portion of Donegal Bay, "there was no use in shooting lines when there was no fish in it—they used to fish the bay with long lines in the summer time, both inside and outside regularly, until the trawlers came in May, 1885, and, though they did not come into that bay, they injured its fishing—the trawlers working outside have had that effect in Inver Bay—there was no fishing at all inside except for fluke."

Other witnesses stated that the fishing in Inver Bay had not improved since trawling was prohibited in it. Generally the men fish more outside the bay, because the fish are more outside and they follow them out as far as they can go. "It was a good bay until these last three or four years" for hake, sprat, glasson, and other fish, but they had not a good hake fishing for about seven years—nor sprat fishing for about five years—nor herrings for seven or eight years.

In this (Inver) Bay, trawling has been prohibited by by-law since 1857, now thirty-two years.

With respect to other parts of the bay, the following were some of the statements made by the line and net fishermen :—"For the last four or five years we had as good summers as ever we had; but from the end of last summer and this summer we had no fishing at all." "When you have fourteen trawlers scraping the fishing ground, night and day, how could it be expected we could catch any fish in that water." "There is none of any description in the bay now; for when the sprat and small fry fall off, the large fish disappear with them,"—they should be prohibited from coming within a line drawn from "Rathlin O'Byrne to the opposite side out beyond Roskeeragh, from Rathlin O'Byrne to Aughriss Head." "We used at times to catch five or six turbot on a shot—not very often"—principally round fish, cod, ling, haddock, gurnet, and whiting—observed the first decrease in the latter end of last summer for "line fishing and decrease again this summer—"there is no fishing at all." In reference to a part of the bay in which trawling had been prohibited from 1857 to 1870, one witness in answer to the question "Do you believe there

"is much damage done to the fishing by the trawlers?" replied, "Well, I can give no account about them, but I know at the time the trawling was prevented inside the bay we had no herring fishing at that time any more than we have now. It did not make a bit of difference in my opinion." Another witness stated that "they had a good herring fishing last year—never better," about the foreshore; and from his experience of "long line fishing the same class of fish has been taken by long lines as formerly, and in as great quantity; that he 'killed forty-three fish on one shot, almost a mile from Dougal, last year,' and 'from fifteen to sixteen turbot each day for a fortnight or so;'" the trawlers did not work there—it was shoal water. This witness also worked on board a steam trawler for about two months, and a sailing trawler of between 10 and 15 tons for four or five years, and was also a herring fisher. When trawling he worked outside St. John's Point, and from that to Doorin Head, and took eels, turbot, britt, and all sort of flat fish—not much fry—the large trawlers work in deep water mostly—"from 35 to 33 fathoms, and from that to 18"—"they get a good supply of fish sometimes"—"great quantities of sole, plaice, and britt," and large and good fish."

The manager of the Dougal Bay Fishing Company, lately formed, said they had two vessels, steam trawlers, the largest 75 feet over all, 17 feet 4 inches beam, 25 horse-power; the other 46 feet long, and 9 feet 6 inches beam. They commenced to work on the 8th or 10th April, 1886, and had been, at the time of our inquiry, at work only three and a half months. "The first day we caught five britt. For the next two days we caught practically nothing. The fish kept very small up to the beginning of June. In the middle of June the takes began to increase, and continued so until the end of our season. The first month we were out I may say we caught next to nothing." "The large vessel did work in the deep. The small vessel was only out twice since we got her." This man was fourteen years in the trawling business in Scotland, and stated he never saw anything resembling spawn taken up by the trawl. He thought the by-law prohibiting trawling in Inver Bay had done the fishermen a great deal of harm. The master of the trawler, who had seventeen years' experience on the north-east and south coasts of England, on the south coast of Scotland, and in the North Sea, stated that trawlers cannot work over the herring spawning place, as it is rough ground, where "you could not trawl without destruction to your net," and that he had never done injury to fishermen's lines—that if they came across a line they would not carry it away, as "the hook will break before the line will, and the trawl will pass freely."

AT KELLYBEGS.—The evidence was much of the same character. No fewer than thirteen witnesses were examined. The decrease had taken place for two years, since the trawlers came. "The fish might vary. Some years we would get more, and some years less; but there never was a time that we would not catch some fish with our nets and lines till these last two seasons." "We always made our support by fishing until those trawlers came into the bay. There has not been a shilling earned since they came in." They only fished three months, and then went away. After the trawlers went away "we killed what made our support. There was better fishing then than there is now." Before the trawlers came "there were years when we killed from fifteen to sixteen dozen, and from ten to nine dozen in a day—cod and ling." The herring fishing in 1886 was as good as any year, for many years. They were "got mostly on the part of the coast where the trawling was not going on." There were days on Bundoran Strand that we got from £3 to £5 worth of turbot. We killed none this year, for as soon as they come in from the deep "see those trawlers have them all picked up." The trawlers don't go to Bundoran, "they go where they can make money." "I did not go out at all this season." "We could not fish with thirteen trawl boats ploughing up and down the place where we were in the habit of fishing. How could we fish!" The St. John's Point men are not fishing, "they had to give it up." "We want only to have a fair chance, and to leave us our own old way of fishing that we always had."

The trawlers only worked three months last summer (1885)—three sailing trawlers. That was the whole amount of trawling in the bay. "The trawlers are taking more soles than we could take." One witness stated, that last season he supposed he "earned up to £100 by his boat, including salmon, lobsters, cod, ling, and all." That included what he made by the herring

Kellybegs, Co.
Dougal.

"fishing"—'nearly £50.' He 'never saw any season so bad as the last two "seasons." Men that always were able to take plenty of eel and ling were not "able to kill one at all this season."

The Coastguard officer handed in the following return of the amount of fish taken between the 28th May and 1st September (1886) by the eight sailing and two steam trawlers, and landed at Killybegs. There were, however, fourteen sailing trawlers working in the bay, but he had not the return of the fish taken by those that landed their fish at Donegal, Bundoran, or elsewhere round the Bay.

No. of Trawlers.	Week ending	No. of Boxes	Rough Fish Baskets.	Remarks.
1886.				
5 Sailing.	29th May.	10	7	
Do.	4th June.	11	9	
Do.	8th and 11th June.	8	5	
8 Do.	18th June.	30	20	Weather calm.
2 Steam Trawlers.	24th "	108	50	
8 Sailing.	3rd July.	33	28	
8 Do.	17th "	54	50	400 pair of soles.
2 Steam Trawlers.	15th "	13	10	
Do.	27th "	27	54	
Do.	28th "	17	25	
Do.	29th "	11	14	
3 Sailing Trawlers.	30th "	9	5	
2 Steam Trawlers.	30th "	12	45	
1 Do.	31st "	5	52	
2 Do.	3rd August.	23	61	
1 Do.	4th "	7	NIL	
1 Do.	5th "	9	20	400 pair of soles.
2 Do.	6th "	11	22	
1 Do.	10th "	9	16	
1 Do.	12th "	10	4	
1 Do.	14th "	9	30	
1 Do.	18th "	18	30	
1 Do.	19th "	10	10	
1 Do.	21st "	10	53	
1 Do.	23rd "	8	9	
1 Do.	24th and 25th August.	13	16	
1 Do.	26th, 27th, and 28th Aug.	20	13	
1 Do.	31st August.	9	7	
1 Do.	1st September.	10	7	
		434 Boxes.	643 Baskets.	

In his evidence the Coastguard officer stated, that till the trawlers came in they had a great scarcity of fish in Killybegs and neighbourhood. Very few fish brought in that were not saleable, and most of the small fish were bought up by the huxters and sold in the country. No scarcity since the trawlers came, and the fish was now abundant and cheap; the rough fish was sold in the town at about a shilling a basket. He had been in the place about seventeen years, and had "always heard the fishermen complaining that they could "get no fish. I have always heard them say so, and the reason they gave was "always that they had no gear; that if they had better gear and a better way "of fishing they would get more fish." Two trawlers landed their fish also in Westport, Co. Mayo, as their buyers were there; some were landed at Mountcharles and Donegal and Bundoran.

A fisherman, who acted as skipper of one of the trawling vessels from 3rd March till a few days in August, stated, they did not get so many small unsaleable fish in the shallow as in the deep water, from fourteen to thirty-five fathoms.

Another witness stated that "before the trawlers came he went from Killybegs to St. John's Point, and into Donegal Bay, and got a take of fish of fifteen dozen hake, glasson, and pollock, and went back five days after and "got none, "the trawlers had come to the bay in the meantime." "I don't "think men could take fish with either line or nets while trawlers were at "work on the ground; it would be impossible, because they steam over the

"ground, drawing their beam and net after them, and then they wheel about and drag it back again"—they get fish each time, what they like—"saw fourteen dozen of hake taken in the trawl at one haul, and sole, turbot, brill, and gurnard, and some dabs." He thought that if the St. John's Point men had larger vessels they would succeed very well and would make a better livelihood.

The master of one of the trawlers stated that he "was trawling in the bay six or seven weeks; trawled over the same ground constantly, up and down as near as he could, and got fish again on the same ground—just the same—sole, plaice, brill, turbot, dabs, gurnards, hakes, haddocks, rays, and skate. Last week the fish had increased. A shovell full or two of small fish would be the most to have to throw overboard after a six hours' scrape—engaged from morning till night scraping and re-scraping the same ground, "as near as we can." "We turn the soil over where there is food for the fish." "Believes it brings fish to it." Another witness, who was opposed to trawling, in reply to the question "Do you believe there are more fish taken out of Donegal Bay now than there used to be?" stated "There are more, I am certain."

AT TEELIN.—Six witnesses were examined. It was generally admitted that there was a great decrease in the fishing. It had fallen off for ten or twelve years, but this year was the worst of all. This was attributed to the trawling. "It is about three weeks since they were out here. I think there were fifteen altogether—fourteen or fifteen—half a mile or a mile and a half off the shore." "A middling good cod fishing season." "If they had good boats and gear they would not complain of the trawlers." "The fish is plenty enough outside in the deep, but we have not the gear and boats to go out after them—"the boats are not big enough to go out to fish for them." "The greatest quantity of sole taken on the lines was about twenty, and of turbot six to twelve at one shot—out towards Rathlin O'Beirne, where it is foul ground, and the trawlers could not work. This was the first season the steam trawlers appeared in the bay. No hake here for the last twenty years." "We have to go farther out to sea after the fish, and our boats are not big enough to go out for the fish." They don't get the fish so near shore as formerly. Have now to go out six or seven miles. "When the herrings came in here formerly we used to catch them just along the shore, but now they are keeping out and we have not boats to go out after the fish, and it is that that keeps back the prosperity of the country. If we had the boats we could catch plenty, for the people here are good fishermen." "It is thirty years, except one winter, since the herrings came in." "There is plenty of fish out away at Rathlin O'Beirne—it is thirty miles out. Another good fishing out by Inishmurray. We went out there and we filled our boats at once, and we could have filled them again but we were afraid to go out—cod and ling. Very seldom can go out in the winter; there is a time of the year we cannot go out, our boats are too small." "About three months in the year they cannot go out, and sometimes they would not be able to go out for a full month." "Often times we are kept in for a day, and sometimes for two or three days in a week. Sometimes we have our lines and boats for days ready to go to sea and we have to remain ashore, and sometimes we go out, and before we are half-way out to the fishing grounds the weather changes, and we have to come back again." "Buyers come to the shore and buy the fish. Had a good cod fishing this spring (1886), and only for the stormy weather it would have been much better." "If we had a good day we could fill the boat with cod in four hours." "Large cod—not codlings."

A fish buyer and curer—the manager of a Fish Curing Establishment set up about the year 1858, but since given up, stated "in the first year we commenced in the height of the season, January and February, and we often had 300 dozen fish of a day, all taken in-shore. The fishermen at that time had not to go so far off the land to catch fish as they had to do latterly when the fishing failed. It commenced to fall off about the year 1863. It became worse in 1864, and worse again in 1865, until there was nothing at all worth while buying. There were lots of herring bait in 1867, 1868, and 1869." "Herring was the first thing that left, and after that the big fish left also." "As long as we had the supply of fish the establishment went on very well." It was the failure of the fish made it be given up. The dealings with the Teelin men were most satisfactory and honest, "they could not be better in every way."

Teelin, Co.
Donegal.

"I had transactions with them all and I always found them as honest as 'honest could be.'"

At this place there were thirty-four boats registered with 174 men.

We have given the substance of the evidence taken round Donegal Bay at greater length than we would otherwise have done in consequence of the importance of the fisheries in the bay—the number of fishing villages round it—the great numbers of persons engaged in fishing, and that, in a portion of the upper part of the bay, trawling had been prohibited for over thirteen years, viz., from 1857 to 1870, and that there is a portion (Inver Bay) in which trawling has been prohibited for over thirty years.

According to the evidence, the fishing in that (Inver) bay has not improved, although preserved for the line and net fishermen for so long a period. Were we to act on the evidence alone, it would have become our duty to submit a by-law for approval removing the interdiction against trawling in that bay.

Since the prohibition against it in the upper parts of Donegal bay was removed, in 1870, we have no data on which to form a judgment as to the effect, save evidence of the most conflicting and embarrassing character.

A few very small trawlers only fished occasionally in that ground until the last two years when a small company was established in Donegal, and a number of large trawlers were sent from England to fish in the bay—and one steam trawler came from Killala Bay. They only fished a short time in 1885 and the summer of 1886, and the whole decrease in the fishing has been attributed to the action of the trawlers for this short period.

The prohibition advocated was within a line from Rathlin O'Beirne Island to Anghrius Head in the county Sligo. Such an interdiction would effectually put a stop to trawling altogether on the coast. Without more information on the subject, we are inclined to believe, that no Governing Department would submit such a by-law for approval.

Donegal, with its several inlets or bays, is a place where important experiments might be made on the effects of trawling or its prohibition, and, considering the vast importance of the subject, we think such should be undertaken at the public expense.

If the interests of the fishermen living round the bay, are alone to be considered, and that they should be left in their "own old way of fishing that they always had," as advocated by one of the witnesses at Killybegs, then all trawling should be prohibited within the line mentioned by the witnesses. There is little doubt, that the result would be, to deprive the public of a valuable description and quantity of fish, and tend to make it dearer in the markets; while the advantages to the poorer classes of fishermen round the bay would be of a most doubtful character, as may be instanced in the case of Inver Bay, where the fishing has not improved, although trawling has been prohibited for over thirty years, and in the upper parts of the bay, where it had been prohibited for thirteen years, one witness (a net fisherman) stating that he knew "at the time trawling was prevented inside the bay they had no herring fishing at that time any more than they have now."

Since our inquiry, we have had a statement from the manager of the Donegal Bay Fishing Company, in which he says "This company have had "two steamers working in the bay during part of the time since the inquiry. "In 1886 left off trawling 13th November; in 1887 commenced 25th April, "left off large vessel 10th September; in 1888 commenced 30th April, left "off both, 18th July. Our catch from September to end of 1886—51 boxes; "made £88 11s. 8d.; our catch in 1887 was 219 boxes, made £411 8s. 6d.; "our catch in 1888 was 57 boxes, made £94 15s. We stopped fishing early "last year. The season was only poor up to the time we stopped, and when "the fish came into the bay later it was too late for us to resume business. "As we have no local men who know anything of steam trawling, we have to "get men from England or Scotland; besides when anything goes wrong with "the machinery we have to bring engineers from Londonderry. Between the "extra expenses and loss of time we find that steam trawling in Donegal Bay "is not a paying business. We have sold our largest vessel, and the small "one is presently for sale.

"The local men who have sailing vessels and who work themselves are "doing fairly well. They got a good supply in the latter part of last year, "and up to November or December—splendid soles and turbot. They are "presently (March, 1889) getting fair supplies of plaice."

The vessels engaged in trawling in Donegal Bay in the years 1887 and 1888, are given in the following returns received from the Coast Guard Authorities.

In 1887.

NAME OF VESSEL.	Tonnage.	Worked by Steam or Sail.	Native or otherwise.	Date of Commencing.	Date of Discontinuing.
Restless Wave, . . .	15	Steam, .	Native, .	5th April, 1887.	25th November, 1887.
Widdie, . . .	8	" . . .	" . . .	" . . .	" . . .
Mary Spinks, . . .	18	Sail, . .	" . . .	" . . .	" . . .
Shamrock, . . .	10	" . . .	" . . .	" . . .	" . . .
Fanny, . . .	5	" . . .	" . . .	" . . .	" . . .
Willie Miner, . . .	8	" . . .	" . . .	" . . .	" . . .
Templar, . . .	10	" . . .	" . . .	" . . .	" . . .
Queen, . . .	5	" . . .	" . . .	" . . .	" . . .
Wanderer, . . .	5	" . . .	" . . .	" . . .	" . . .
Shire Dand, . . .	28	" . . .	Neary, .	" . . .	" . . .
Sven, . . .	19	" . . .	Peel, . .	" . . .	" . . .
Hamilton, . . .	18	" . . .	" . . .	" . . .	" . . .
White Star, . . .	19	" . . .	" . . .	" . . .	" . . .
Zephyr, . . .	21	" . . .	" . . .	" . . .	" . . .
Porpoise, . . .	24	" . . .	Londonderry, .	" . . .	" . . .
Betty, . . .	12	" . . .	" . . .	" . . .	" . . .
Royal Norman, . . .	18	Steam, .	Ayr, . .	18th May, 1887.	Stayed about 14 days.
Revivalist, . . .	43	Sail, . .	Dublin, .	17th May, 1887.	Stayed about a month.
Ardie, . . .	23	" . . .	" . . .	3rd June, 1887.	Stayed about a week.
Total number of Boats worked by Steam, . . . 5				Number of Native Boats, . . . 9	
" " " " Sail, . . . 15				From other Ports, . . . 10	

1888.

NAME OF VESSEL.	Tonnage.	Worked by Steam or Sail.	Native or otherwise.	Date of Commencing.	Date of Discontinuing.
Restless Wave, . . .	15	Steam, .	Native, .	1st May, 1888.	24th October, 1888.
Widdie, . . .	5	" . . .	" . . .	" . . .	" . . .
Mary Spinks, . . .	18	Sail, . .	" . . .	" . . .	" . . .
Shamrock, . . .	10	" . . .	" . . .	" . . .	" . . .
Fanny, . . .	5	" . . .	" . . .	" . . .	" . . .
Willie Miner, . . .	8	" . . .	" . . .	" . . .	" . . .
Queen, . . .	5	" . . .	" . . .	" . . .	" . . .
Wanderer, . . .	5	" . . .	" . . .	" . . .	" . . .
Anna Maria, . . .	10	" . . .	Sligo, . .	" . . .	" . . .
Lia, . . .	31	" . . .	Peel, . .	" . . .	" . . .
Hawk, . . .	8	" . . .	Native, .	29th Aug., 1888.	28th November, 1888.
Thoma, . . .	10	" . . .	" . . .	" . . .	" . . .
Total number of Boats worked by Steam, . . . 2				Number of Native Boats, . . . 10	
" " " " Sail, . . . 10				From other Ports, . . . 2	

SLIGO BAY.

SLIGO.—At this inquiry, twelve witnesses were examined. There are six Sligo Bay, small vessels of from 3 to 4 tons burden engaged at trawling. Larger Sligo boats cannot be used in consequence of no safe harbour being in the locality. The only one is Rockley, which is tidal; and large vessels had to be given up. These vessels would be very unsafe in the deep sea, and have not the power to trawl in deep water. They are all sailing craft, and according to the evidence they can only trawl on an average about two days a week, and only for about three months in summer. They are laid up for the remainder of the year; and, when herring fishing sets in, the fishermen on board give up trawling, and follow herring fishing. It however has failed since about 1872. Trawling has been carried on for about fourteen years. The herring fishing being infinitely more profitable than trawling it would be followed, and trawling given up for the time being, if herrings had continued, or when-

ever an opportunity would arise for herring fishing. In addition to these six sailing craft, there is a small steamer that occasionally trawls.

The fishermen who follow line and net fishing, however, bitterly complain of the general decline of the fisheries, which they attribute to trawling. They say that before there was any trawling they could kill any amount of herrings. "One boat often killed 5,000 to 8,000 of a night, while by lines it could earn £1 up to nine o'clock in the morning with flat fish, turbot, or cod. The herrings would be worth £17 or £18, and at that time also could earn £1 a day with the lines. Since the trawling commenced the boats did not come up to 1,000 for the last twelve years, until this season when they got 700 to 800 herrings. For the last twenty years not much herrings were taken in Sligo Bay. They used to get them in August, and up to Christmas. Twenty-five years ago they could get 5,000 to 6,000 herrings, but now they would not go out at all—the trawling has banished them."

One witness stated that there was a good herring fishing fifteen or sixteen years ago in Sligo Bay; but he could not say whether trawling was then going on or not—there might have been one trawler or two at work, but not more.

Another witness stated that "about fourteen years ago, outside the Whoston Rock, just inside the Ledge, he fished eight nights, and got every night from 3,000 to 5,000 on an average, and if he had as good nets as he had now he would have hauled 15,000 or 20,000. The water was deep, and his nets were shallow, and would not go down. He got 5s. a hundred for them. He was only out there twice since, as the weather did not answer, because there is a heavy sea from the Ledge that runs in on the banks. There was very little trawling thirteen years ago. Not more than two or three the last few years. The long line fishing also decreased. "Can get no fluke now, except a couple of dozen, and we used to get seventeen, and eighteen, and twenty dozens before it commenced."

This year one man got ten dozen flat fish on his lines in the same place that the men trawl. He called it a bad fishing. The season of 1886 was an average year for the lines. Another witness stated "it was the worst for seven years for flat fishing."

On the part of the trawlers, evidence was given that the herring fishing had declined for many years all round the coast, even where there never was any trawling. It was suggested "that when the herrings come in enormous quantities into shallow water" they exhaust their food, and have to seek new pasturage, and get into other waters where they can get a supply of food. The fact of their coming and going periodically is established. The trawling in Sligo Bay could not, they say, have injured the herring fishing, as there was on an average an open season for them for five days out of the seven, as the boats did not work more than two days a week, and then they only worked for about three months. Outside the Bird Rock there is very good trawling ground, but the water gets too deep for the small boats to trawl in.

"Three-fourths of the fish caught by the trawlers would never be caught by the long lines. The same kind of fish are not taken on the long lines—all large soles."

Evidence was also given that in Browne's Bay, Stroudagh, Cloonagh, Ballycunnell, and other places round Sligo Bay where there was no trawling carried on, the herrings had failed for many years.

There is nothing in the evidence in our mind to justify us in coming to the conclusion that the failure of the herrings was caused by trawling. It would appear that it failed either before trawling was introduced, or at a time when there were only two or three trawlers working in the Bay.

The herring fishing was the principal fishing in this Bay.

KILLALA BAY.

Killala Bay,
Inishcross,
Co. Sligo.

INISHCROSS.—A large number of fishermen and fishing boats at this place. The boats are all open, of about two tons. Since 1883 the greater portion of the men have taken to the "otter" trawl. They also carry on fishing by lines, nets, and lobster pots. The most contradictory evidence was given as to the question of the supply of fish and the effects of trawling; the feeling, however, seemed to be general against a large steam trawler which had been

used in the bay for a few years. It is owned by a man living near the bay who purchased it by means of money from a loan granted to him under the Irish Reproductive Loan Fund Act.

Eleven witnesses were examined. The first was a fisherman who followed herring and salmon fishing, and was using an otter trawl three years. He considered trawling was an injury to the spawn of fish, and also killed a large quantity of fry. Of the latter he stated he "had taken twenty to thirty" and up to forty in one scrape, in about two miles of the bay, and he would take "ten or twelve scrapes of a favourable day—perhaps more or less—the fry are 'thrown overboard mostly alive.' He complained of the decrease in the supply of fish generally since he commenced trawling, and 'for the last two' years the herrings had decreased in that part of the bay—but on the west side they were plentiful—2,000 to 3,000 of a night to a boat. The trawlers 'give up when the herring fishing begins—they trawl principally in the summer season beginning in April and up to November. The herring fishing generally commences in July. Thinks the trawling scares the fish away, for when it was first introduced the fishing was very good, and now it was not worth much. It should be prohibited from Carrowhubbuck to the Poreh."

We placed little reliance on this man's evidence. It turned out that he trawled but seldom.

Another witness, who was fishing in the bay over forty-five years, said, "the place is totally wasted altogether on account of trawling, and I often witnessed it, and proved it, and as to line fishing, the chief support of, I dare say, forty families, there cannot be a line dropped in it except in the winter season. I was often a week that I went up to £22 on soles, long line fishing, including other flat fish, and now there is nothing, although I have gone to a good outlay of £25, and I would be quite willing to do away with it altogether, because the place is wasted. As for the herring fishing, when there comes a shoal of herrings in it, and they get into the shallow water, we get them very good that night. Then there comes the steam trawler, and it breaks the whole shoal of herrings into small little shoals, and there is not more than a hundred or two to be got next night—"as for long line fishing it is done away altogether." 'Used to earn from £60 to £80 in three months from the last month of summer to the second month of autumn.' If lines shot now, the continued trawling would carry them away—did not mean the small boats so much, as they had a better idea of where the lines were put. Beam trawling was more destructive than otter trawling, and he would put them outside a boundary line, and have a close season. As to the winter fishing, it was as good as it had been for the last thirty years—that is from November to January. It is carried on up to twenty-six fathoms in depth, abreast of Kilcummin, and they got haddock and whiting, cod and codlings—some days up to 500 whiting—hardly a hook without a fish."

Another witness, who followed line, nets, and lobster fishing as well as trawling, said he "was the first person in Inniscrone that ever used a trawl. Did not see any difference in the capture of fish—perhaps not getting exactly as much—but this year's capture was more than last year. In nine months he was able to trawl only fifty-nine days. He was twenty years herring fishing and never got more—never had a better season than '86." Another witness, who followed herring fishing and trawling, said "If trawling is prohibited in Killala Bay we may as well leave the country." Another witness gave similar testimony.

There is no doubt all the fishermen here were opposed to trawling by steam and with the beam trawl.

The owner of the steam trawler stated, that he "was trawling in the Bay about nearly five years, and part of two years, some time ago, with a sailing trawler; that he was getting more fish on an average than he did five years ago. A few days before, he got thirty-two pair of sole in one haul in about three hours. That was the best haul of sole he had ever taken in Killala Bay. That was in from four to eight fathoms of water. He also got two large turbot from 12 to 15 lbs. weight, and some small ones of 3 or 4 lbs., two or three large brill, and three or four score of plaice. When he works in three to three and a half fathom of water he would get a good deal of small fish; the first thing done is to throw them overboard, alive. If his trawling were prohibited inside a line drawn where it was proposed by the fishermen, it would stop his trawling

"entirely. He might get a day or two in the spring, when the fish are coming in, and when they are going out in the fall. He had tried the Bay in every direction up to fifty-eight fathoms. He thinks it would be an advantage not to allow any trawling inside of three fathoms everywhere." He further said—"In reference to the herring fishing, two years ago, I trawled the whole season in Killala Bay and nowhere else. That season the fishermen got more herrings than they did for twenty years before. Last year I went in the herring season to Donegal, and was away in Glasgow getting my boilers repaired, and they got very little herrings. This year I began to trawl again, and they are getting plenty of herrings."

Another line fisherman, who also uses an otter trawl in his boat, said they "did not get as much fish with the lines as they do now with the trawls, and that there was more fish now produced and sent to market—" they are sent oftener now, and more fish, and better for the man that is working himself. "If he had to fish by line he could not support his family at all, and should go to the workhouse."

To prohibit trawling within the line proposed, and exclude these small boats using the otter trawl, would be a serious drawback to the fishermen, and would tend to embarrass, if not put a stop altogether, to a growing industry at this place. We see no reason at present for doing so. If, on the other hand, the prohibition only extended to large vessels engaged in beam trawling, it would be an encouragement to the continuance of the use of small boats where it is so desirable that an improvement in the class of vessels employed in fishing should be made; particularly as, lately, there has been a pier erected at this place, where large vessels might be kept in safety, if some further improvements, absolutely required, and which we hope may be carried out, in the harbour, be effected.

LACKEN BAY, COUNTY MAYO.

Lacken Bay,
Lacken,
Co. Mayo

LACKEN.—This Bay is adjacent to Killala Bay. It lies immediately round Killemmis Head, and extends across from it to Lacken Head, a distance of about 1½ miles. All the fishermen round this Bay follow line, net and lobster fishing. The trawling began about three years ago, principally with the steam trawler belonging to Killala Bay. They bitterly complain that, since its introduction, all sorts of fishing have seriously diminished. They spoke of great captures of fish by lines and nets before trawling, and this year "there was nothing at all to be got."

There were five witnesses out of a large body of fishermen who gave evidence, and all corroborated each other. In fact, their evidence went so far that it was now hardly worth fishing in the Bay.

In contradiction to this, the owner of the steam trawler, which was so much complained of, stated that he had been trawling in the Bay on the Thursday night before our meeting, and that in one haul in two or three hours he had taken fifteen pair of large sole and some brill. The soles were about a couple of pounds each. He was out trawling the evening before that, and, between that and the Thursday night, he sent off four boxes of fish to market. They included one box of soles 2 cwt. If a prohibition were made against trawling inside a line, such as proposed by the fishermen, from Downpatrick Head to Lacken, he stated that he might sell his vessel as soon as he could get a buyer, for he did not believe he could catch a fish at all. The effect would be to abolish trawling. He did not find any diminution in the quantity of fish captured. This year he had fished altogether in Lacken Bay with the exception of a couple of weeks in Killala Bay, and had caught more fish of every kind than he had caught any other year. He never destroyed nets or lines by trawling, and never took up spawns, but did, a quantity of small fish when he got into shallow water, and thought it would be an advantage to prohibit trawling within the four-fathom line, as it would save the small fish. He also stated that he did not think the Bay was properly fished by the local fishermen, as he had not seen a line in the Bay for some weeks.

We have since received a report from the owner of the steam trawler referred to, in which he states that he had trawled in 1887 and 1888 in both Killala and Lacken Bays, and that the catch of fish in 1887 was better than the previous year, and in 1888 was still better.

In this Bay important results might be attained if we had the means of making practical experiments and collecting statistics.

GALWAY BAY

The evidence taken at Galway, with our views thereon, has been made the subject of a special Report to Your Excellency in Council.

As we declined to make any by-Law prohibiting trawling in this bay, our decision was reviewed by a Judicial Committee of the Privy Council, under the provisions of the Act of Parliament passed last session and, after hearing witnesses on both sides, our decision was upheld.

To that report and the proceedings before the Privy Council we beg to refer.

Passing down along the west coast, where little if any trawling has ever been carried on, and where it cannot be said any of the bays or seas along that extended line of coast are overfished, and where the fishermen are only, as a general rule, partially engaged in fishing, we come to

BRANDON BAY, COUNTY KERRY.

CLOHANE.—The fishermen round this bay follow line, net and lobster fishing. No trawling was ever carried on in it. Trawling has been prohibited by a by-Law made in 1860, now nearly thirty years ago, and even the oldest fisherman does not recollect trawling having been carried on before the enactment of that law, save a yacht belonging to a gentleman. Five witnesses were examined and gave evidence of great captures of fish on the lines many years ago. One man said that "about twenty-eight years ago he saw from 'twenty to thirty and forty pair of sole killed after a night. There used to be 'great fishing of every description—ling, haddock, and cod fishing—until the 'last few years. Haddock has left the bay many years ago, hake also. All has 'been declining for two years back. They would not now get five pair of sole of 'a night. Fish buyers attend the shore and send the fish up to Tralee. They 'get from 1s. 3d. to 1s. 6d. a pair for the large sole; and they could also get from 'ten to twenty and twenty-six turbot in one day's fishing. The fishermen are 'getting worse in their condition than they were twenty years ago, much poorer 'and down to the lowest degree; they are in greater poverty than they were 'forty years ago. "No use now in having a canoe, as the fishing is gone." They 'all fish in canoes or corraghs, no boats at all. Their gear is improved, 'inasmuch as they have nets now that they had not forty years ago."

Brandon Bay,
Clohane, Co.
Kerry.

They attribute this falling off to trawling in Dingle Bay. They all urged the importance of having larger boats and better gear, but they could not get security for loans.

DINGLE BAY, COUNTY KERRY.

DINGLE.—Ten witnesses were examined at this enquiry. At Dingle there are about 18 sailing trawlers, all first class; their average tonnage being from 18 to 41 tons. The crew of each consists of 4 men. Trawling is the principal mode of fishing in the bay, and it has been carried on for many years. On the part of the trawlers the substance of the evidence is as follows:—One witness stated that—"There was no difference in the quantity of fish 'captured and brought into market year by year—that there were as many 'soles killed for the last year as ever killed before." Remembered when 'trawling was prohibited within a line drawn from Bull's Head to Connara, and 'was fishing in the bay when that by-law was in force—that he saw no change 'since that by-law was repealed—that they had since taken more fish out of the 'bay, sole, turbot, and other flat fish—that he had fished in that part of the bay, 'and took a large quantity of fish, principally in months of October, November, 'and December—that he had seen as many soles counted out of that upper part 'of the bay for the last month as ever he had seen before—that on this ground 'they would take perhaps 20 pairs of small soles a day, and flat fish about 'half the size of his hand—the largest fish altogether are taken on the outside 'ground. He never saw spawn taken up. Sometimes, in spite of themselves, 'they got foul of lines belonging to men fishing in the canoes, but when they 'take a line away by accident they would pay for it."

Dingle Bay

Another witness, a trawler for thirty-five years, stated he "did not see as many fish taken since the by-law was passed as had been for the last two months—on the ground from Bull's Head to Annascaul—and that the repeal of the by-law prohibiting trawling in the upper part of the bay, which was in existence from '52 to '62, had brought more fish into the market, for when the fishermen had not that place open for trawling, they would not trawl in the west ground at all. Opposite Ventry, where trawlers are fishing winter and summer, there is more ling caught for the last three or four years. They catch haddock, cod, and ling. For the last fifteen years I did not see so many haddock taken as where they are trawling now. Even the fishermen of Brandon are coming up among the trawlers to fish for cod and haddock." All the soles and turbot caught are sent to the Dublin market.

Another trawler, who had twenty-five years' experience of the bay, stated that on that ground the soles caught this year, generally speaking, were much smaller in the run than those caught in former years. "There has been no decrease in the number of pairs of soles taken up there. In fact we have several more this year than I saw for the last ten years. Some boats got as high as 400 and 500 pair of soles there. That is within the past two months, and they get sometimes 10 to 20 pairs of hake per day, and some days only a few pair." This witness admitted in further replies that they were "not getting as much fish as the first;" but, "more this year than for the last six or eight years, and at that time of the year—November—up to the present."

Another witness, an owner of a trawling vessel, stated he commenced about eight years ago, and at that time, three years after, he had not any haddock coming in; but "for the last eight years it had increased to an enormous extent, so much so that the Brandon men have come up here." Also that "there had been an increase of cod for the last two years." The trawlers take a good deal of cod, and this year there has been an increase of hake. "I have seen more hake taken this year than any other year in the trawl." Three years ago there was a very bad take of soles, but it has been increasing since. "Turbot has been very scarce this year, and also brill and sole." With regard to the ground that had been preserved from trawling from '52 to '62, but had since been open to trawling, he said—"Eight years ago, the first year I went out, my boat brought in from Annascaul 80 pair of sole, and it was looked upon as a great take. There was not such a take for years before that. That was one day's fishing. There has been considerably more taken this year by some boats."

He recommended that trawling should be stopped for two or three months in summer, say from 1st June to 30th September, as, in consequence of not having a quick mode of conveyance to market, the fish generally became bad, but if they had facilities for quick transit that would not be necessary. "Two days are lost sending the fish to market, and the fish is lost because the weather is warm." The boat owners generally, it would appear, would agree so far as that was concerned. During the summer months some of the vessels go round to Galway where they have railway communication at hand.

On behalf of the Annascaul fishermen who live in the upper part of the bay, which had been protected from trawling for the ten years between '52 and '62, and who fish out of "canoes" or "corrachs," principally by lines, it was stated, that "within about twenty years ago there was a large abundance of hake, cod, haddock, ling, herrings, mackerel, and scud in the bay. From seven to ten horses were daily engaged taking those fish from the landing-place near Annascaul to Killarney, Tralee, Lis-towel, and Limerick. At that time the trawlers began to invade the bay, and there has been ever since a steady decline, year after year in the take of fish. During the summer months, from April to September, each canoe had three spillers, and the take each night with each spiller was from 25 to 100 pair of soles. There were six or seven canoes and three men to each canoe. For the past five years the sole fishing has been given up altogether, and with regard to the other fishing the fishermen consider they will be obliged to give that up also, so trifling are the takes that they make. They account for this decline in the fishing by the damage done to the spawning-bed, by the trawls. Until the trawlers appeared in the bay they never noticed any

"spawn on the beach, but since then they have frequently seen it, thrown up of course by the trawls, and driven in then by the tide. There were eleven canoes between Dingle and Inch, and beyond Inch, in Castlemaine Bay, the number of people who used to fish formerly, when the fish were in the bay, have given it up altogether. Twenty of these men have no land at all, and their sole avocation is fishing, when they get the fish to take." Witnesses were produced to prove this state of things. One man from Annascaul who had been fishing for the last fifty years continuously, winter and summer, with seines, herring nets, and spillers, stated that "there was an abundance of fish—acad, mackerel, cod, hake, and soles, every description of fish, if they had the articles to fish with. There was no mention of trawling then, that was about thirty years ago. There were seven boats going out from the Castle of Minard, six or seven from Dingle, four or five from Minard Harbour, and four or five from Annascaul and Cromane—there was full and plenty, in thousands and hundreds. No less than seven and eight and ten cars would meet at the beach, waiting until the boats would come in in the morning. A good deal also was kept at home."

"They thought the trawlers drove the fish out of the bay. The fishermen of Annascaul had to give up fishing, and are not fishing now—they used to take thirty and forty pair of soles those days on spillers. "We often took 120 pair of soles of a night," before the trawlers came into the bay. "It is closing on forty or forty-three years ago."

Another witness stated he "could at one time get 120 head of hake in the morning. The general take would be "from 60 to 120 in his own boat," with a trammel net—that was about thirty or forty years ago—they began to decrease then. It is about twenty years since he gave up fishing, when there was no fish in the bay, and then it would not support him."

Another witness stated that "it was about forty-five years since he commenced fishing—there was plenty of fish then, sole, fluke, hake, herrings, mackerel, haddock, and cod—there were about eight or nine boats and canoes from Annascaul, and a great number of boats going all round the harbour, from all sides of the bay where they were depending on fishing. "Every boat of them used to take a good deal of fish," and "often saw seven or eight cars taking it away from Annascaul." "From the time the by-law was broken it is decreasing in our harbour, and every year getting worse. Often fished this year, and I suppose it couldn't be worse." There are six boats at Annascaul, and "there was nothing but a scatter of herrings and it is not worth while talking of them." It is his opinion that the trawlers drive the fish out of the shallow water "because when there was a shore to fish from, and when these trawls were fishing we wouldn't get any the following day. We don't think it worth our while to go out the following day or night." He does not use spillers of late, "has them locked up in the house idle." "Confined to herring and hake fishing the last seven years, because he could not catch any fish with his spillers. When the trawling was stopped in part of the bay "the fishing improved in our part of the bay—we felt it a good deal improved in our part. "We felt the fish decreasing always since the trawl fishing began. We were getting a fair quantity of fish, except for the last fourteen or fifteen years, and "every year since then it is getting worse." "Until trawl fishing commenced in the bay I never saw spawn on the beach or shore, but I have seen it since."

Another fisherman from Annascaul said, "I lived by fishing for the last twenty-seven years," and "we used half load our canoes every day we would go out fishing with trammels, lines, and spillers." "Used to take large quantities—cod, haddock, codling, and whiting, until about twenty years ago, when it commenced falling off." "When I first commenced I used to take from twenty to forty pairs (acks), in my own spillers some mornings, and every one of them fit for market. Three spillers in a canoe, and used to commence about 20th April, and continue at the sole fishing till about the middle of August—June was about the best month—then we used to commence at the herring and hake fishing, and continue till Christmas—then the spiller fishing again for cod and ling." This witness, in reply to the question—"What kind of hake fishing had you last year?" answered, "I will tell you what I had since last year. I had but one trammel only. I can't afford to keep a second trammel, as I used before that. The first night I put it out, to the best of my belief, I had thirty hake in it; the second night there were thirty-six in

"it, and the third night I had forty hake in it and two cod-fish. On that morning, when I was pulling my trammels, we saw a trawl coming along and they commenced to trawl in the same ground where I had my three nets the previous three mornings; and when we set our trammels the fourth night and that day, all the hake I got was four, and to the best of my belief there was not four more in the canoe." "Last year I did not get more than £15 by hake altogether"—"got about £20" for the herring fishing, "for the three of us." "There are ten or twelve men, at Annascaul, who have no way in the world of living but to fish."

Another witness, in reference to the sole fishing, said "sometimes there would be 80 and 100, and sometimes 120 pair in the canoe together on the three spillers. There used to be about 700 fathoms to our spiller, and all that continued up to about twelve years ago. It was reducing always up to the last seven years, and we got none at all in the end." "Confined now to hake and herring fishing and some lobsters. The bay was getting worse after the trawling commenced until at one time my three spillers were 'trusting to three bare soles.'"

The same class of testimony was given by all the witnesses. There is no doubt that since the by-law of 1862, prohibiting trawling in the upper part of the bay inside of a line from Bull's Head to Cunnuna, was repealed, the Annascaul fishermen, and those living round that part of the bay, have taken a considerably less quantity of fish than they did previously, and that Annascaul and other small fishing villages have been nearly extinguished so far as fishing is concerned. Whether the quantity taken altogether by the trawlers and line men, from that part of the bay, is less or greater than heretofore, it is impossible, in the absence of statistics of any kind, to determine.

The evidence, which we have given at greater length than we would otherwise have done, in consequence of the fact that trawling had been interdicted in a good part of this bay for ten years, is, as will be seen, of the most contradictory and conflicting character, and hardly to be depended on; certainly not to be reconciled.

Two of our body, who held that inquiry, had recommended that the old by-law repealed in 1862, should be re-enacted, and also that trawling in all parts of the bay should be interdicted, during the summer months; but, on considering the whole subject more closely we came to the conclusion, that even this would not settle this vexed question, for, after a few years, there would, without doubt, be a recurrence of the old state of things in 1862, which led to the repeal of the by-law made in that year. The only mode of doing so, was by practically testing the grounds, both inner and outer, of the bay—carrying on, for a few years, practical and scientific experiments, and enforcing accurate statistics of the fish caught in certain parts of the bay, the modes of fishing employed, and the times and seasons occupied by each class of fishermen at their own particular avocation. Our decision would then be of some value, as it would be based on sound principles, and not on the conflicting and contradictory testimony of witnesses, who could not, on either side, be impartial. A by-law based on such principles might not give satisfaction to both sides. It would at least be respected, and would be likely to prevent the re-opening of this question.

Should the means be sanctioned, we would be prepared with the necessary assistance to take steps to carry out our views. There is hardly a bay in Ireland better adapted for such a trial than Dingle Bay, as the fishing interests of either side would not be altogether extinguished, as it might, in other bays, by any drastic measure on our part in determining this question.

KENMARE BAY.

*Kenmare Bay
Co. Kerry.*

KENMARE.—Very little interest is taken in the fisheries of this bay. They are very unimportant. There were formerly about fourteen trawlers fishing in the bay about twenty-five years ago; now there are only four, and also six yachts that sometimes trawl. They only work a few miles down the bay. Trawling was tried in the deep water to see if more fish could be got, but, "they did not get much fish there—very little." Fish has greatly decreased in quantity; one witness, however, stating he considered it had not decreased much at present, more than it was a few years since. In one *trawl*, five or six years ago, they would get as much as they would get now in one day. One

trawler was then as good as five or six now. "The trawlers don't get ten small unmarketable fish in a thousand, and even these might be of use. The very small fish are thrown overboard alive. The bay is at rest from January to May—no trawlers are then at work. Most of the vessels are then employed carrying; the others are laid up." The witness did "not consider the ground would be improved if it were let alone for a few years, for the place that is not trawled over is not a bit better than the other parts. There is a part of the bay in deep and shallow water that is never trawled. The line fishermen complain that they do not get much fish on their lines. The quantity of fish taken altogether in Kenmare Bay is very small—hardly worth speaking of. Any soles taken are of a good quality—some 3 lbs, some 2½ lbs, and they might catch an odd one of 4 lbs, but generally they are about ½ lb. in weight." A witness stated he believed that "the trawling ground is worse when it is not trawled over, and after trawling a ground for some years the fish come again." The average earning of a trawler of sixteen tons in the bay would not be more than from £50 to £100 in the season. Some years are better than others. "The quantity of fish was much the same as usual with the exception that the year before last was better than a great many of the years past, up to some seven years ago. We found the quantity of fish very bad. We found plenty of fish, but it was very small on the ground."

The foregoing is the substance of the evidence received by us at the enquiry. The line fishermen did not appear, and no interest was apparently felt in the matter, the fishing being altogether so insignificant. There does not appear to be any enterprise in the locality to carry on fishing more into the deep sea, the few trawlers limiting their operations to within about five or six miles of the town of Kenmare.

By a By-Law dated 10th November, 1865, Trawling was prohibited inward or eastward of a line drawn from Herring Rock on the north, near to Fearn's Point on the south. This was repealed in 1870, in consequence of the evidence that it was only hampering an industry, and doing no good to the trammel nets, which it was meant to protect.

BANTRY BAY.

Meetings were held at Bantry and Castletownbere. Eighteen witnesses were examined.

Bantry Bay,
Co Cork.

Bantry.

BANTRY.—The allegations made were, that the system of trawling was calculated to deprive something like 1,400 or 1,500 persons of the means of subsistence, that number being dependent on the fishing industry for a livelihood, and that the practice of trawling in the bay, and particularly by steam trawlers, which was bitterly complained of, had tended to extinguish fishing altogether in the bay.

The following is the substance of the evidence taken.

One witness, who fished with lines and trammel nets for twenty years, remembered when there were few sailing trawlers in the bay, and "there was any amount of fish of all kinds." Now "it would not pay a poor man to be after it." "The trawl boats destroy the young fry and disturb the ground, and frighten the heavy shoals that come into the bay and drive them out." "The sailing trawlers are not constantly trawling, but the steam trawler is." "The steam trawler only came this year; and even this year we had a good prospect of hake, and prepared to take any amount of it, but it only remained three or four days, and we could not get at it."

Another witness complained of losing his nets by a trawler two years ago.

Another witness stated the falling-off was due to the trawling vessels which were "tearing up the mud and disturbing the fish, and they run away." "When the mud is disturbed the fish, of course, run away."

Another witness stated that he knew trawling was a great injury to Bantry Bay, "because it brings up the fry and the spawn at certain seasons of the year—September to Christmas." He said he took up spawn in a trawl in Glengarriffe Harbour.

On the part of the trawlers it was urged that the decrease in the fish, if not accounted for by the fluctuation in the supply of fish which takes place in this as well as every other bay, was due to the illegal fishing by trammel nets in the bay; that the number of trawl boats in the bay had been steadily declining for some years, and the falling-off complained of could not consequently be due to them; and with regard to the steam trawler, it did not come into the bay until July, 1886.

A trawl boat owner in Bantry stated that he had two trawl boats, one of them being a steam trawler, a screw boat, 67 feet long, and about 28 tons burden; the trawl beam was about 48 or 50 feet. "The trawling ground in Bantry Bay was very limited, owing to obstructions. He believed that trawl boats would rather benefit than otherwise the supply of hake, as "it would rather help to develop food in the bottom of the bay for the fish to have the trawl going over it." "The second trawl boat that comes along gets as much fish as the first boat. I have never known a boat to object to having the second scrape." "The steam trawler came about June, or thereabouts; she did no injury to nets. It is easier to avoid them in a steam than in a sailing trawler." And with respect to trawling improving the ground, he stated, "I can prove positively that I find when we scrape the ground that we stir up the ground deposit there, and in that way, I believe, we give the fish more facilities for food." "Only a small proportion of fry is brought up by the trawl"; and with regard to taking up spawn, he said, "In my experience we have never taken anything like spawn on board our boats—not the smallest particle." "The fishing fluctuates very much, but this was a particularly bad season for fishing. The last spring season was very good, if it were not for the weather." "We had in our sailing boat in one scrape 624 lbs. weight of soles and turbot, and plenty of other kinds of fish besides." "The soles were a good large size. Turbot don't abound much in the muddy bottoms; the trammel men catch them in 'puzzle' nets in foul ground, where the trawlers could not go. Very fine plaice are taken in September."

Another witness—a skipper of a trawler in Bantry Bay for seven years—stated that "the trammel net men always kept their nets out in the water from one end of the week to the other, and that was injurious. He never saw spawn in the boat, but he saw a fish in the trawl ready for spawning."

Another skipper of a trawl boat gave similar testimony.

Other witnesses who had been trawling twelve and twenty years in Bantry Bay gave similar evidence.

Castletown B.R.
Os. Cock.

CASLETOWN BERE.—The application from this place was principally to allow trammel nets to be left in the water after sunrise up to eleven o'clock in the day, if trawling was to be permitted, and the prohibition against trawling from middle of August to January was advocated, so that the trammel nets for hake might be safely used. There was no hand-line fishing for hake, of any consequence carried on in the bay. The trammel nets were principally shot from the lighthouse to No. 1 Fort on the eastern side of Bere Island; most of the trawlers work in that part of the bay the summer season round. The steam trawler works on this ground, and one witness said "she did not destroy any of the nets," but she often gave me a wet jacket to haul my nets when she was coming." The fishing the last five years was about the same average. "If a man sold all the fish he would catch he would make £4 or £5—that would be about the average in a good season." "The trawls take up the spawn" and "disturb the spawn beds." "Some years there were times when the fishermen would not fish at all. I think we ought to have five months and a-half of the year."

Another witness, a net and hand-line fisherman, stated—"The fishing was getting worse; remembered when he could make £90, and now would not make £5. That was seven years ago, and it is getting worse ever since." He could not say to what that was to be attributed, but—"I know that trawling is injurious to it." "If they had from September in the bay they would not care very much about the rest." "Finds great decrease in the amount of hake caught by trammels for the last five years, but in his opinion it is worse for the last two years." The chief part of the fish caught was for their own use.

Another witness, who was fishing from fifty to fifty-five years, but had given it up the last three years, being too old, and who only goes out now and then with trammel nets, said they "had far better fishing twenty years ago than now—the harbour is good for nothing now." "It is falling off for many years—for eight or ten years. We used to catch a good deal of fish in the old times before the trawlers came in." "Trammel nets are left in the water more in the daytime than they were twenty years ago." He blamed the trawlers for taking up the spawn and for the falling-off in the supply of fish, and recommended that the trawlers should be kept a distance outside the trammel nets' course.

Two trawlers were examined. One of them had only trawled nips or ten days that year. The substance of the evidence given by the other trawler was as follows:—"He went to the deep sea fishing for mackerel, and when that failed, went extensively in for trawling, and after getting gear that cost a lot of money, he did not think they should be sewn out short. It would not be fair to limit trawling as proposed; he never saw spawn in a trawl. The best months for trawling were from February to June, and from the end of July to November. They would not care if it were stopped the rest of the year. "As for the trammels in the bay, I have seen them out morning, noon, and night."

Trawling is prohibited, by By-Law made in 1861, in this Bay between sunset and sunrise, and, by By-Law dated 1858, at all times in the upper part of the Bay, within lines drawn from Crowdy Point to Carrigakey Rock, and from thence to Reensavanny Point on the north shore of Whiddy Island.

The evidence produced before us at these enquiries was not such as would warrant us in making any alterations in these By-Laws. We did, however, permit by By-Law in 1887, trammel nets to remain in the water after sunrise, and up to ten o'clock in the day, and between three o'clock in the afternoon and sunset, during October, November, December, January, February, and March, and between sunrise and seven o'clock in the forenoon, and between five o'clock in the afternoon and sunset during the remainder of the year. This was to prevent any loss to the fishermen using these nets, by being obliged to have them removed out of the water between sunrise and sunset, as directed by law, and which was constantly disregarded, from stress of weather and other causes.

WATERFORD COAST.

The enquiries were held at Passage East and Dunmore. Seven witnesses were examined. The substance of their evidence is as follows:—

PASSAGE EAST.—Trawling in Waterford Harbour is nearly all carried on by open yawls, about three tons; the beam trawl is used, about 18 feet in length. The first witness stated "he was about thirty years trawling. The principal ground was from Dunmore to Cheek Point." Confining his observations to that part of the harbour between Creden Head and Cheek Point, where trawling by boats over 10 tons is prohibited, he stated "the fish was decreasing all the time he had known it. Sole, plaice, and fluke are the principal fish taken—only a very odd turbot. The soles are not large in those days, because they won't be let to get large, as they trawl for these in the first days of May, when they are just coming out of their spawning beds." "If you go out on the banks next April you will see hundreds of tons of spawn there— young fish on their spawning beds. In May or June they come to perfection if they are allowed to live; but they are not allowed, for the trawlers take them when they are too small to be of any value, and they are shoved overboard with a shovel." "They would become marketable about August. Everything that can carry a sail is trawling in May and June. The Passage men, who generally follow salmon fishing during these months, don't trawl, unless they go out for a take of fish for themselves on Saturday. Trawling should be stopped in the harbour in April, June, July, and August. Young fish about the size of my hand are taken and sent away." The decrease has been going on gradually. "Formerly I often made £4 in a night; now we could not make fourpence." "Had any amount of fish after trawling had been prohibited, when they were allowed to trawl in 1873. From that it has been going back all the time—all kinds of fish are declining."

Another witness, who had given up trawling for fifteen years because he found "it did not pay," and was "continually and visibly declining," stated "that it was owing to the trawling—the steam trawling that is so constantly going on—the fish get no time to rest or breed." "The big steam trawlers working outside that does the mischief." "Trawling should be stopped from 1st May to 1st September, both inside and outside the harbour." "If you did not close it outside, it would be useless to close it inside; if the fish are killed outside the harbour they can't come in; they should be left time to mature." "The greater part of them spawn outside." "There were a number of men here that used to make their living by spilling during the winter season between this and Creden Head. I have known some men

Waterford,
Passage East.

"to make 30s. a-day by it—cod and tumbling (codling) and whiting;" but "now it has died out altogether—it is a thing of the past." "For the last twelve years no great herring fishing." "It was general with them every year to come in, but we never had any heavy fishing except one year—they came in in November—winter herrings." "The fish are getting scarcer every year, and the winter we have just passed over has been the poorest I ever remember for all sorts of fish."

Another witness, who was trawling for thirty years inside the harbour, from Creden Head to King's Channel, with a two ton boat, stated that "sole, plaice, fluke, and round fish are declining not only in number, but in size and quality; thinks it is caused by the trawling outside. With their small boats they trawl in the summer months, and sometimes we make £1 a man per week." "They begin to get the good fish about the latter end of August; there should be four months' close time, say three miles inside the Hook."

Another witness, the owner of a ten ton trawler, "remembered the time a man would earn £1 a week line fishing where now he could not earn 5s." "Herring fishing gone down also." "If they had better boats they could make a good thing of it." "There are no boats trawling here before the 1st September, except gentlemen's yachts, and sometimes the Dunmore boats come inside and let go their trawls." "Cod-fish, too, has decreased very much in the harbour, and I think it is all owing to the trawling outside."

DUNMORE EAST.

Dunmore,
Co. Waterford.

DUNMORE EAST.—At this place three witnesses were examined. The first witness, a trawler (a Tenby man), and owner of two trawling vessels—24 and 35 tons—stated "the steam trawling was ruining the fishing, which was decreasing for the last thirty years, between twelve and thirty miles off the coast. There are six steam trawlers working here, between this and the Smalls (west of Milford). One of them took into Tenby last Tuesday 24 cwt. of soles and 5 tons of other fish—one day's fishing." "If they go on much longer the Union will be our doom. Our little smacks won't be worth two pence in the course of a few years; in fact we can't get men to work in them at the present time." "They trawl about six miles south-west of the Smalls." "Steam trawling should be abolished altogether in the Channel."

The nearest point trawling is carried on, is twelve miles from the Hook, and up to about thirty miles from it, south-south-west. Substantially no trawling is carried on within three miles of the coast. The fish have got very scarce for the last four years, "all owing to the steamers." "There are plenty of men here that can tell you that the steamers will ruin all our craft."

The other witnesses corroborated this evidence; and one of the witnesses, the owner of two trawl boats, gave the following returns of the amount of money earned by each for ten years, viz. :—

The "Sovereign," from 1st January, 1876, to 31st December, 1885

	£	s.	d.		£	s.	d.
1876,	195	1	4	1882,	220	17	0
1877,	168	15	0	1883,	162	1	6
1878,	179	10	4	1884,	113	15	0
1879,	194	0	0	1885,	101	1	0
1880,	219	12	0	1886,	115	7	9
1881,	176	15	9				

"Uncle Sam" for same period.

	£	s.	d.		£	s.	d.
1876,	198	9	8	1882,	164	2	11
1877,	209	0	0	1883,	159	14	7
1878,	185	17	11	1884,	126	2	0
1879,	163	0	5	1885,	157	4	1
1880,	133	8	9	1886,	105	19	2
1881,	174	13	9				

The expenses of each trawler are about £125 a year; so that by the "Sovereign," in 1876, the amount earned was £70; in '77, £43; in '78, £54; in '79, £69; in '80, £94; in '81, £51; in '82, £96; in '83, £37; in '84, a loss of £12; in '85, a loss of £24; and in '86, a loss of £10.

By the "Uncle Sam"—In '76 the amount earned was £78; in '77, £84; in '78, £60; in '79, £38; in '80, £8; in '81, £49; in '82, £59; in '83, £34; in '84, £1; in '85, £12; and in '86 there was a loss of £20.

"This affords a fair criterion for the rest of the trawling vessels." "I have not done much better or worse than the rest. I may have done a little better, as I looked very closely after the sale of fish we took, and the other trawlers had not the same facility."

The foregoing is the substance of the evidence taken. There is no hand line fishing from Dunmore—nor hake fishing by line—for about four years.

It will be seen that so far as the Dunmore trawling is concerned, it has been substantially carried on *beyond the territorial limit*, and therefore any restriction could only be accomplished by International arrangement.

There are eleven English and thirteen Irish trawlers at Dunmore, all first class, and the general complaint is against the practice of steam trawling. With regard to the Harbour of Waterford, a by-law was made in 1852, by which *all trawling* was prohibited within a line drawn from Creden Head, in the county Waterford, to Temple Church, in the county Wexford. This By-Law remained in force for eight years, when it was repealed, and a By-Law made in 1860, by which any boats over 5 tons were prohibited from trawling within a line drawn from Creden Head to Temple Church. This By-Law was repealed in 1873, and another enacted, prohibiting trawling by boats not exceeding 10 tons within a line from Galtier Cottage, in the county Waterford, to Broomhill Point, in the county Wexford. The effect of this last By-Law was to allow larger trawlers—up to 10 tons—to fish inside the harbour, instead of 5 tons, as in former By-Law, and to allow any kind of trawler to work about a mile higher up than formerly permitted, and this By-Law is now in force.

Some of the fishermen have now urged the prohibition against even these small trawlers in the harbour during four months in summer. During this time these men are engaged in salmon fishing, and do not follow trawling except, probably, on a Saturday (when they cannot fish for salmon) for their own use. Except the evidence of these men, we have none. If acted on, and trawling prohibited during these four months in summer, an injury might be inflicted on others who do not follow salmon fishing, without doing any substantial public good. It is one of those cases where we consider important results might follow on practical and scientific experiments being made inside the harbour. Without them, or practically testing the ground to ascertain if the statements made are well founded, we do not consider we should make any By-Law, as the evidence on the subject of prohibiting trawling, as proposed by the witnesses, would not, in our opinion, justify us in saying that the decrease has been caused by trawling only inside the harbour, or at the periods mentioned.

WEXFORD COAST.

WEXFORD.—At this place there were six witnesses examined. The following is the substance of their evidence:—

The first witness was interested in seven fishing vessels, five of them being trawlers, and two in the herring fishing—the trawlers are from 14 to 23 tons, and have been engaged in trawling on the coast for twenty years. "There is not near the same quantity of fish of any kind taken now to what there formerly was." With regard to the herring fishing, "there have been only two seasons within twenty years that there has been any reasonable take, off this coast, of herrings." "From three to four miles off the land is the general trawling ground." A very great diminution in soles. "You might almost say they had completely deserted the coast." The trawlers work along the coast from Greenore to Cahore Point, all the year round. In the summer time they trawl by night, but in the winter chiefly by day. "The reason of that" is chiefly on account of the bar (Wexford), which makes it impossible for the boats to get in except at certain states of the tide. They cannot come in at low water on the ebb tide, unless with a favourable wind, and even then a great deal of time is spent in coming in; but if the pier (Rosslare) was finished, so as to give them shelter when coming in, it would give them an opportunity of remaining on the trawling ground much longer than they do at present." The fish is brought to Wexford. About nine trawlers on the coast, and five or six men in each. There are more men employed on

board the trawlers in Wexford than in any other district. Within twenty years the number of vessels has decreased; "not half what it was." Trawling has been carried on here over forty years. "There has not been £5 made on an average by trawl boats for the last five years, as far as the owners' portion is concerned." During the herring fishing, the trawlers are generally laid up or go after the herrings, and there is very little trawling done; the herrings are in from about the 1st November. "Several boats used to go out for mackerel fishing every year, but, from the bad times, they are all gone to the bad. "There is not one boat now goes to the mackerel fishing."

Another witness, interested in three vessels of from 14 to 18 tons, and who was acquainted with the trawling industry for sixty years, stated that the quantity of fish taken by the trawlers "is very little now to what it used to be at that time. Very little compared with the quantity they brought in sixty or fifty or even forty years ago." "Has not formed any idea as to the reason of the falling-off; the herrings had fallen off also. He had three boats at one time fishing off Howth and to the north—off Dunmore, Howth and Wicklow and round the coast."

There are four or five boats engaged in the long line fishing, and that has also decreased a great deal. "I used to catch myself as many as sixty, seventy or eighty cod when I went out line fishing; but now the most they are able to take is sixteen or eighteen." It is not carried on on the trawling ground. "They trawl in between three and four fathoms. Sometimes they go to the south coast where the depth is about eight fathoms, but it is in the north they mostly trawl." "Since the decline of the fishing the Dunmore boats have given up coming. None of the boats are paying at present."

Another witness stated that he considered "One reason of the flat fish declining was, that formerly there were no big trawlers working at Dunmore, but now there are up to twenty trawlers constantly at work there." "The fish are caught there before they can come into our bay." "It was the bad weather beat the herring fishery, in his opinion, because the men can't get out at all by night by reason of the bar." He "remembered when sixty and eighty and one hundred pair of sole would be taken in a night with a small boat; now, when the weather is fine, some of them might get sixty pair." "It was a good place for turbot this time three years. We caught twelve or thirteen a day with one boat—there was none caught this year, or last year." "Not much hake captured—no trammel net fishing for hake; the trawlers work very little within three miles of the shore—generally outside that distance; some of the herring fishing is within half a mile of the coast."

Another witness, owner of a small boat of 2½ to 3 tons, and who followed herring fishing during the season for twelve years, stated, "the herring fishing had decreased materially. "I remember to have forty mease (636) of herrings in salt at this time of the year, when now I would have but three." "The decline has been caused by trawling, and it should be discontinued during the herring season—from the 1st October until Christmas—the herring fishing is carried on generally in from a fathom and a half to between five and six fathoms of water—from two to three and four miles off the coast. "I have found them trawling in the very same ground that the herrings are on, in about two fathoms of water sometimes, and they drag the trawl net right through the herring bed, and disturb the herrings." "The trawling in the day disturbs the herrings, and they leave their beds; trawling was carried on during the great herring fishing twelve or thirteen years ago."

Another witness stated, that "all the fishing on that coast takes place between the Long Bank and the Blackwater Bank. The fish are found within a small space of ground not more than three miles off, and that is the cause of the disputes between the trawlers and the herring men." He believed "the flat fish do not come into the bay every year in the same quantity. Two or three years ago we had a very good supply of turbot, and, in other years we have had very few. In the same way soles are sometimes very plenty, and at other times they are very scarce." "The great impediment to the development of the fishing is the bar. If there was a proper harbour at Roslare I believe all the trawlers would use it."

It will be perceived that the trawling along this coast is carried on, practically, beyond the three-mile limit, and, therefore, is a subject for international arrangement, if it is to be prohibited.

To protect the herring fishing on this coast, a By-Law was made in 1849—

Prohibiting trawling in all places in the district, where there are boats engaged in herring drift net fishing, and that trawl boats should keep at a distance of at least three miles from all boats fishing for herrings or mackerel with drift nets, and whenever herring or mackerel boats shall commence drift net fishing off the coast, trawl boats shall depart therefrom, and keep at least three miles distant.

This By-Law is in force at present.

DUBLIN BAY.

KINGSTOWN.—There were nine witnesses examined at this inquiry.

The allegations made were, that there were fifty to sixty families about Kingstown, depending on the line fishing, and that about thirty years ago, a good fisherman's earnings were about £3 to £4 a week, for from four to five months in the year, and now it had dwindled down to about 10s. to £1, all owing to the illegitimate trawling going on in Dublin Bay, not so much by professional trawlers, but a habit that has sprung up of gentlemen's yachts and small boats trawling. The falling off continued, by degrees, from thirty years to seven or eight years ago, and some fishermen say, that after the torpedo firing in the bay, the surface of the sea is literally covered with fish which have been killed. The substance of the evidence given is as follows:—

The first witness stated that, "thirty years ago he could earn from £4 a week to £1 5s., and now for the last ten years he could not earn £1 a week, "and from that to 10s.; it is all through trawling in the bay killing the "brood and spawn." He complained of several small boats and gentlemen's yachts trawling in the bay contrary to law; he did not see any of the large Ringsend trawlers trawling in the bay within five years.

Another witness, who had eighteen years' experience of the bay, stated "he was forced to leave the bay and fish from the Lightship to the Nose of "Howth, and from it to Wicklow. He would not be able to earn 10s. a week "in Dublin Bay, but able to earn 30s. to £2 where he goes." With regard to the torpedo practice, he "had seen millions of fish on the top of the water—"the other day the whole bay was covered with dead fish—that has been carried "on for the last two or three years—pollock, whiting, and herring, and all "sorts of fish floating about in the harbour." "The decrease principally took "place about five years ago." "I was getting from £3 to £4 a week in the "Bay of Dublin for about six weeks, and the trawlers got one night in it, "and they cleaned it just the same as a scavenger would clean the road."

Another witness—About thirty or thirty-five years ago "there was any "amount of haddocks, and whittings, you could earn 30s. or £2 a week and "more than that occasionally, sometimes £3." "It is very trifling now in "regard to fishing in Dublin Bay; it would be a good week I got £1, "and from that to less—an average of 15s. would be as much as I could "earn."

Another line fisherman for sixty years stated with regard to the fish in the bay, "Instead of increasing, they are greatly decreased." He remembered the time before trawling was prohibited. "We could catch on 300 hooks, "fourteen score of fish, and we could catch on the next drop ten score, and "the next drop five score." "On a fair average a man might earn 10s. or "12s. a week in the bay; trawling is the cause of the decrease; thirty or "thirty-five years ago the fish was plentiful." "We used to sell them for "upwards of 6d. a score betimes, and now they go to 2s. and 2s. 6d., and "2s. 8d. a score, for what is on the catches."

Another witness—a fisherman 60 years—who remembered when the by-law was made prohibiting trawling in the bay, said:—"It would be "impossible for me to tell you the plentifulness of the fish in every direction "in every part of the Bay of Dublin." "Ever since that it has been falling

Dublin Bay

Kingstown.

"off, and becoming worse and worse every year." "I have not earned from 3s. to 4s. 6d., and from that to 6s., these five weeks and two days." "With the exception of the time the big trawlers were in the bay, trawling by permission for dead bodies, he did not see a big trawler in the bay for forty years. The fishing has gradually decreased from time to time." The haddock "have disappeared out of the bay for the last thirty-five years;" "never get in the bay now the same class of plaice that used to be got forty years ago. We might get sometimes three or four or five. The cod fishing has also fallen off—not to be had now at all in the bay. The Dullkey fishermen are just the same as the Kingstown men; their catches have been decreasing the same as ourselves. Herring fishing also failed." "There was none got this year. It has been a failure for forty years. There are about forty or fifty at the hooks. The number of fishermen at Kingstown are much the same as forty years ago, only they get less earnings, and never were so poor." "Some of us at the present time are only just holding our head above the water." "The men have to go further out to sea to earn their livelihood. The class of boats are just the same; no improvement, and not able." About forty years ago "I have been setting 19 score of hooks, and I have been getting about 16 score of plaice on them—good saleable fish. Last Saturday we had about 55 or 56 score of hooks shot, and we got 43 plaice. We cannot get out of 24 score of hooks more than 30 or 20, and from that to 13 or 14 fish." "Generally smaller now."

Another line and net fisherman, who had thirty years' experience of the bay, and went back sixteen or seventeen years, stated he "thought he could then earn 30s. to £3 a week if he fished as much as he does now, or understood it as much." He did earn from 30s. to £2, and now "I don't think, if I was to fish the whole week, and as hard as I could—and there is no man fishes harder—I could earn 30s., unless I went outside the limits." He gets the fish now "from the limits of the trawling, outside the bay." "Plaice and herring, and all fishing in Dublin Bay, and cod fishing has declined anywhere inside in Dublin Bay on the sand." He attributes it all to the action of the trawlers. "Whiting and haddock have disappeared from Dublin Bay; herrings have got scarcer. Would sooner stop a day ashore now than go out in Dublin Bay." "I have got to go out to the Kish Bank. It is a great risk for us, and many a time I would be lost only for the pilot boats, and those large trawlers tow us in, too." "There are four men in the boat, with twenty score of hooks to each man, and sometimes over that. Since the large trawlers got permission to trawl for the dead bodies, which they did for three or four days, about six years ago, he had not seen any of the Dublin trawlers working in the bay."

A skipper, and owner of two trawlers, stated he "had been trawling thirty-four years, and was ten out of the twelve months on board one of the vessels, and that during the last five years he had only trawled once in Dublin Bay, and that was about five years ago, when they were looking for the dead bodies. He got that night five packed hampers of plaice, little and big, all marketable. They made £9 the following morning in the market; he worked all night." "We would not get that much outside anywhere, except at Clogher Head;" "at the time we caught the fish the plaice was not taken on the hooks; they lay at the bottom that time." "It is a great shame to see the amount of fish lying there, and the trawlers not allowed to catch it. The hooks got the fish very plenty afterwards for some time, until the fish left." "The trawlers don't care about Dublin Bay always; we would like to get a chance when fish is in it to take them out." "In the winter months the wind for trawling in the bay should be from the west or north-west, a southerly or easterly wind would not do."

The coastguard were examined as to the correctness of the statements, that trawling was carried on with impunity in the bay by small boats and yachts, and they stated, the trawling could not have been carried on without the knowledge of the coastguard; it could only have been done by stealth, and was not a regular practice.

Trawling was prohibited in this bay in the year 1842, and though there have been infractions of this law from time to time, it could hardly be maintained that trawling was a regular practice, or, carried on in such a systematic manner, in any year, as would cause injury to the fisheries in the bay by either

over-fishing, destroying large quantities of brood or fry of fish, or disturbing spawns. The trawling could only have been done by stealth, and on occasions that it was discovered by the coastguard, the parties were prosecuted at the public expense.

The substance of the evidence given by the line and net fishermen is, that it is now hardly worth while fishing inside the limits of the bay, and that they have to go outside for a considerable distance, much further than they formerly did.

Again, the trawlers allege that there is at seasons plenty of fish in the bay, and that they are not taken by the lines, while they (the trawlers) are prevented by law from taking them.

Both views were put before us at the inquiry, and, in order to test the accuracy of the statement, that there was plenty of fish in the bay, we authorized two trawlers to fish all over the bay for two days, on condition, that a coastguard officer should be on board to register everything taken up by the trawl net, the trawlers getting the advantage of all fish taken by them. The first question asked, "who was to pay them?" "They might come across obstructions, many of which were in the bay, particularly in the shape of lost anchors; they might be damaged thereby; might lose their net, &c., and further, that at that time they were getting good fishing to the north, opposite Clogher Head, out in the channel, at a depth of thirty-five fathoms, which they would lose while fishing in the bay." It was also urged that, except at certain winds, trawling could not be effectively carried out in the bay; the wind should be from the north or north-west. Here was a combination of circumstances, difficult to reconcile when we were, so to speak, at the mercy of a vessel or its owner, capable of making experiments that might have led to important results. At length, one of the trawlers consented to trawl in the bay of a Saturday, that being an off day, or one on which the trawlers laid up, as there would be no market for their fish next morning.

The experiment was made on the 5th February, 1887, and the result was as follows:—

REPORT BY COASTGUARD ON BOARD.

The place marked on Chart where Trawl was towed, and time.	The Course run when Trawling.	The Depth of water.	The length of time Trawl down.	The time when Trawl taken up.	Total No. of Fish.	Salable Fish.		Unsalable Fish.		Spawns or small fry of Fish.	The wind and weather.
						Description and No. of each.	No.	Description and No. of each.	No.		
Porting Lightship, N. E.	N. & E. to N. by E. & E.	27 fath.	1 hour 20 minutes.	12.15 P.M.	25	Fishes, 20	25	Fishes, 20	20	Spwn.	N.W., light breeze, with showers.
Salley, E. by N. 10.15 A.M.	—	—	—	—	—	—	—	—	—	—	—
Salley, E. & N.	N. N.E. to E. N.E.	12 fath.	1 hour 5 minutes.	5 P.M.	43	Fishes, 20 Oysters, 3	43	Fishes, 4	4	Spwn.	Light and variable, clearing.
Porting, N.E. by N. 1 P.M. 1.15 P.M.	—	—	—	—	—	—	—	—	—	—	—
				Total.	68	68	68	24	24		

The day was very unfavourable for Trawling, the wind being light and variable.

This experiment really proved nothing, for an abundance of fish might have been found after continuous trawling for some days.

The trawlers themselves appeared to be careless about the opening of the bay. They had not applied for a repeal of the By-Law, and merely advocated free fishing therein, "to get a chance when fish is in the bay to take them out," and particularly "in the winter season."

Seeing the difficulty of the position, we felt it our duty to apply for authority for the expenditure of a small sum (£50) for the hire of a steam trawler, by which we could practically test the accuracy of the statements on both sides, and of making experiments which might have proved useful. The result of the fishing might turn out to be such as would not only have rendered this expenditure unnecessary, but, perhaps, have left a profit from the sale of the fish captured. We pointed out this in our application for authority to expend this small sum. The proposed expenditure, however, was not approved, and we were reluctantly obliged to abandon our attempts

to gain information, which might have proved of the most useful character, not only to ourselves in future cases, but to the fishermen in general where trawling is carried on, and where grave complaints are made against it, but to the public at large, and probably to scientists, who would have doubtless been glad to receive authorized versions of practical experiments.

EAST COAST.

HOWTH.

Howth, Co.
Dublin.

Howth.—At this place there were six witnesses examined, and very keen interest was felt in the inquiry.

A line and net fisherman, who had been fishing for twenty years, stated "that the fish was decreasing within that time, except the few haddock that 'had come in lately.'" "We used to take 100 score, and when we would go 'fishing now, perhaps we would not get a score.'" "I have seen 200 score taken 'myself—now it is only a score, generally a score.'" "The fish are more plentiful 'the further they go out to sea than it is along shore.'" "The line fishing 'is generally carried on outside the Kish Ship, and from seven to eight miles 'further from the land—cod, ling, haddock, and conger are the principal fish."

"Cod fishing generally commences at November, and is continued up to 'Patrick's Day, then stops for a time and is continued again all through the 'month of May. It is over thirty years since there was any haddock fishing. 'A couple of months ago got large quantities. They are got from two miles 'to eight miles from the land, and from that to the Kish Ship. No haddock 'got closer than two miles from land. The fishermen attributes the 'decrease to the trawling, which sweeps the ground and destroys young fish. 'He was trawling himself once for a fortnight and he saw every kind of 'young fish killed—four or five cwt. They had to shovel it out. That was 'sixteen or seventeen years ago.'" "One day of this work would destroy us. 'If they kept away for eleven months, and came in one month, the mischief 'is done."

Another witness stated that "cod and all round fish was decreasing. He 'did not agree that the further you go out the more plentiful the supply of 'fish." His experience is—"that you get very little when you go out far." "Last year he went out three days, and more than half way across the channel, 'and we could not get anything twelve miles from the land."

Other witnesses corroborated the statements as to the decrease of fish, and attributing it to trawling, more especially to the large and heavy trawlers now employed. "Within the last ten years there has been a gradual decrease." "Ten years ago I could earn thirty shillings a week all the year 'round, but I could not earn five shillings a week now for the year." "We 'fish everywhere. In the summer time we fish in every part of the channel, 'north and south, east and west, but we keep closer during the winter as the 'weather won't allow us to go out." They go sometimes twenty miles out to 'sea—winter is the best time, and "south of Carlingford Bay is the best 'fishing ground for winter." "We have to shoot our lines where the trawlers 'cannot go."

On the part of the trawlers, evidence was given that the "fishing had decreased, but not much—sides very largely—more than any other fish. Turbot 'also decreased very largely—never take up spawn—take from time to time 'a good deal of fry—never three or four cwt. as stated by one witness." "Supposing we had six hampers of fish I would have three-quarters of a hamper of 'small fish—a hamper would weigh about two and a half cwt." All the diseased 'fish would be shovelled overboard—most of it dead. It is principally dabs— 'very rarely the small fry of round fish is taken." As to the cause of the decrease in the capture of fish, a trawl boat owner, who had been trawling along the coast for thirty-one years from Mine Head on the south to Ardglass in the north, and from that to the Chickens and the Isle of Man, stated "In the first place, we have a good deal larger fishing population. We have 'more fishermen and more boats. The Dublin trawlers are increasing, and 'there are a lot of men now engaged in line fishing along the coast who were 'not fishing some years ago, and then new fishing grounds are brought within 'reach of railways, and fish from minor places is now brought into the Dublin

"market in the very earliest part of the week. I do think there was quite as much fish thirty years ago taken as now with the increased number of boats —the decrease in the quantity continues out into the deep water across the channel, right to the Isle of Man. I cannot say I have any idea of what is the cause of decrease, or why, though there is a larger number of boats and a larger number employed in fishing, there is less fish taken now than there was thirty years ago. The quantity of small fish taken would not be the cause. There is a difference between the size of the trawls used and those used thirty years ago—they sail faster, they work better, and we have more comfort—the gear has increased, the heads, beams, and all."

There are sixty boats now belonging to the port of Dublin.

BALBRIGGAN.

BALBRIGGAN.—There were four witnesses examined at this place, all trawlers. They would not admit any decrease. "The capture of fish was much the same. They trawled from one mile to ten miles off the land, in from four to twenty fathoms of water, mostly within two or three miles. Neither sole nor turbot were diminishing—they don't take much fry. Trawling is carried on from Carlingford Bay to Lambay. They trawl a good deal in the winter, but boats are too small to go out too far in the winter. There was no improvement in the fishing since the By-Law was made, allowing trawlers to fish inside a line from the Nose of Howth from May to November. They did not observe the old By-Law prohibiting it in that place, but trawled away wherever they got fish. The size of the Balbriggan trawlers averages fifteen to twenty tons. Only two boats now hailing from that place for the herring and mackerel fishing, one of them goes to the Kinsale mackerel fishing. If trawling were prohibited within three miles of the coast the three hundred people depending on fishing might go to the workhouse, for that is the only way they have of living." One witness stated that "a trawler, of which he was part owner, made in the two years she was fishing £380. That was her gross money. To stop trawling within three miles of the coast would drive them to destitution."

Balbriggan,
Co. Dublin.

CLOGHER HEAD.

CLOGHER HEAD.—Six witnesses were examined at this inquiry. The first witness stated that he was a line fisherman for forty years, and fished with nets occasionally. "The fishing is decreasing, there is no fish to be caught now." "They shoot their lines in two to four fathoms, about two and a half miles from the shore, generally south of the bar of Drogheda to Balbriggan, sometimes get a score of sole, and sometimes only half a score, and a good deal of cod in winter—commencing about Christmas, and very often the trawlers take away the lines," also "take all the spawn of the fish out of the bay"—the fry of fish. "The worst complaint is the destruction of the gear." "I have seen a hundred weight of fry, and more than a hundred weight, thrown overboard—dead." "Since the By-Law was made opening the bay to trawling, the fishing went back altogether." "We have no fish now only black hake." "After the old By-Law was made prohibiting trawling within a line from the Nose of Howth to Cranfield Point, the fishing improved. The trawlers have cleared the bay of all fish and left none in it." "No fish for either the trawlers or line men. If the fish were there we would get them." "The By-Law permitting trawling to be carried on within the Head lines from May to November has so injured the fishing that for the last three years it has become almost worthless. Trawling should be kept outside the headlands. The round fish has fallen off too." "We are not getting a third of the quantity of fish, nor a quarter of what we used to get twenty-six or thirty years ago." "The large Dublin trawlers do the injury, not the Clogher Head trawlers." "Only for the Dublin trawlers there would be double the quantity of cod and ling and haddock that there is for the line men." "All the injury the Balbriggan or Clogher Head trawlers do, is very little. It is the Dublin trawlers that are injuring the fishery here." "The Dublin trawlers ought to be stopped and let the Clogher Head and Balbriggan trawlers work—they would do no harm." "I saw them shovelling small fish overboard a Dublin trawler; but I never saw a Clogher Head man shovelling fish overboard, nor a Balbriggan man either." "The cod fishing is very good here, but we cannot go to where we could catch them on account of these Dublin trawlers—they would destroy our lines."

Clogher Head,
Co. Louth.

One trawler was examined and corroborated the evidence of the other witnesses as to the great decrease in the fish, and particularly since the last By-Law opening the ground between the headlands to trawling from May to November.

Carlingford,
Co. Louth.

CARLINGFORD.

CARLINGFORD.—Five witnesses were examined. The substance of their evidence was that "the herring fishing in the Lough had declined very much. "Year before there was a good take—that winter was the worst in the Lough. "Three or four winters ago there were twice as many herrings caught as there have been for the last two seasons." "The hand-line fishing has also decreased very much in the Lough. The decrease has been going on for the last two or three years. "Five or six years ago we could catch seven or eight dozen of cod and whiting by working three or four hours in the night. Now a man could hardly get two dozen even on the best nights." "The dredging belonging to the Newry Navigation Company may be the cause of the great decrease. "Line fishing and herring fishing has diminished in the Lough for the last five or six years. Trawling would be a great injury to the herring fishing, "because it disturbs the fish and chases them out of the bay."

The only trawling carried on in the Lough is by one trawler—second class. It was only working for two months and had taken only eight hauls altogether, and only caught eight skate. "The fish were scarce in the Lough in consequence of bad weather, and they did not come into the Lough. Could not say whether the fish were as plenty in the Lough on an average of years latterly as they were ten years ago. Would not say that for the last two or three years there were as many fish caught as there were nine or ten years ago."

The fishing in Carlingford Lough, according to the evidence, has been decreasing materially. This cannot be attributed to trawling in the Lough, for no trawling has ever, as far as we could learn, been carried on there. It has not been overfished, and yet there is this gradual decay going on.

It was out of our power to apply any remedy or suggest anything useful. We did, however, feel that it would have been satisfactory to try at certain seasons of the year by trawling experiments, carefully conducted by some one under ourselves, what quantity of fish was actually in the Lough, their state, and descriptions.

In 1851 a By-Law was made prohibiting trawling within or to the westward of lines drawn from the Nose of Howth to St. Patrick's Island (Skerries), and from thence to Clogher Head, and from thence to Dunsany Point, and from thence to Cranfield Point.

This By-Law remained in force until 1879, when, after inquiry, that portion of it, which prohibited trawling along the coast from Howth to Dunsany Point was repealed, and in lieu thereof it was prohibited to use any trawl-net within these points between the 1st November and 1st May—the effect being to allow trawling from 1st May to 1st November.

It will be seen from the foregoing analysis of the evidence, taken at the different points round the coast, how beset with difficulties is the settlement of this question.

We now proceed to consider the question in its different aspects.

DECREASE OF FISH.

The evidence, on this head, is of the most conflicting, perplexing and speculative character, save in one respect—that of a decrease in the inshore fishing on most parts of the coast, even where trawling was never known to have been carried on, as well as in places where trawling has been prohibited for a great number of years. Brandon Bay is an instance of the former. The fishermen there attribute the falling off to trawling being allowed in a bay, which is a great distance away, and separated from Brandon by a great stretch of country and sea-coast. Dublin Bay is an instance of the latter, where trawling has been prohibited for over forty-five years, and in which few line men now think it worth while fishing.

After the passing of the Act of 1842 which gave power to the Commissioners to prohibit this, or any other mode of fishing they might consider detrimental to the fisheries, Dublin Bay was one of those places in which this power was first exercised. It was considered that the protection of the bay line fishermen would be no substantial injury to the trawlers; while it might give satisfaction to the line men, and would tend to the preservation of the gear—that it would in fact be a valuable boon to the line fisher by affording ground for his operations, where he would be safe from the movements of the trawl boat which not unfrequently committed ravages on his tackle; and this protected ground would be a common for the poor, with which the richer fishermen could afford to part. The great falling off in the haddock, for which Dublin Bay was at one time celebrated, was also attributed to the trawlers which, at that time, were in the habit of taking large quantities of this favoured, and much sought for fish. Since then (1848) trawling has been practically stopped in the bay; for, although, as was proved at the inquiry held by us, that trawlers often invaded the bay by stealth, particularly at night, when they could not be observed, yet no systematic or open trawling was carried on; nor could it have been, even on these excepted occasions, to such an extent as would have had any appreciable effect on the fisheries of the bay. Its present state does not show that the anticipations have been realized; and the haddock, notwithstanding the prohibition, did not put in an appearance until within the last few years, when they have been caught, particularly in the channel, and about two miles out, in great abundance. On the one hand, we had the line fishermen asserting there was no fish in the bay, occasioned by the trawling carried on outside. On the other hand, we had the trawlers asserting, that there was plenty of fish in the bay, particularly at certain seasons, if they only could get the chance of taking them out.

Each side, we believe, considered they were giving fair testimony. Each probably were speaking of different times. Each had conflicting interests, and there were no means of deciding the accuracy of the statements on either side but by a series of trawling experiments carried on occasionally in the bay.

We did, as we have already stated, induce one trawler to trawl one day in the bay; but under very unfavourable circumstances, with the result given before, and on which no opinion could be formed.

We, therefore, felt it our duty to apply for authority to expend a small sum on the employment of a steam trawler for such purpose. The Lords of the Treasury having declined to approve of the expenditure, we were obliged to abandon our design, and matters must now remain in their present very unsatisfactory state.

DISTURBANCE AND EXHAUSTION OF FISHING GROUNDS.

With respect to the disturbance and exhaustion of fishing grounds, no accurate conclusion can be arrived at from the testimony of witnesses alone. It was abundantly proved, in the course of our inquiries, that in places where trawling had been prohibited or had been abandoned for a number of years, the supply of fish was found to have diminished; and on the restoration of trawling it had become better. During the interval, however, of cessation from trawling, nothing was done to ascertain whether there was or was not, at different seasons, a supply of fish in the place not operated on by the trawl. It is well known that even where the trawl net has never been used, fish have, for a time, deserted the place. For what reason is still unknown.

The Commissioners appointed by Her Majesty to inquire and report upon the complaints that had been made against the use of the trawl net and beam trawl in the territorial waters of the United Kingdom, having inquired into the subject on the coasts of Scotland and England, reported in 1885 as follows:—

"This is a point particularly difficult to decide in the absence of all knowledge of the causes that regulate the movements of fish. Several cases of a specific character were mentioned to us where shoals of herring and haddock were alleged to have disappeared from particular fishing grounds after the trawlers had begun to work there. We have had no satisfactory proof that the trawling was the cause of this disappearance. It is the usual practice of trawlers to change their grounds, from time to time, as the supply of fish diminishes, and to return there after a sufficient interval has elapsed. Shoals of fish have occasionally vanished from particular districts without any apparent reason to account for their doing so. We may instance the case of Dublin

"Bay, where, although no trawling has been allowed since 1842, the haddocks, which formerly were plentiful, have disappeared. Off the coast of the province of Bohuslan, in Sweden, the fluctuations in the herring fishing are said to have been most remarkable.

"For about thirty years, more or less, in each century, from the 10th to the 17th, the herrings were abundant, and during the sixty years, from 1748 to 1808, this was the case. In the intervals the fishery was a complete blank, and at the present time has been entirely abandoned.

"On the whole, though fish may be disturbed for a time by the presence of a large number of fishing boats, we have no reason to think that such disturbance causes them permanently to desert any fishing ground."

In many places in Ireland, where the herring fishing was not as abundant as probably the year before, or that it had decreased for a number of years, it was attributed to trawling, if not in the very bay which the herrings had left, in some other adjacent; while we have evidence also that even at the very time, when extended trawling and large trawlers were at work, the herrings appeared in abundance.

The herring fishing is of such vast importance to the poor man, even in the smallest boat or curragh round the coast, that it ought to be protected and allowed to be carried on without fear of interruption. We are strongly of opinion that trawlers should not be allowed to come within three miles of boats drifting for herrings or mackerel. There is no authority, however, in Ireland sufficiently strong to enforce such a regulation. Except in some places, it would be impossible, and even in such places, difficult, for the Coastguard to enforce the observance of such a by-law.

We have reason, from the numerous complaints made to us of the introduction of steam trawlers, that this description of vessels may tend to the exhaustion of fishing grounds. The evidence as to their effect in the Channel, given to us at Dunmore, was very strong. There is little doubt they will materially injure the smaller or less effective sailing trawlers.

DISTURBANCE AND DESTRUCTION OF SPAWN.

We place little if no reliance on the repeated statements that the action of the trawl disturbs and destroys the spawn of fish.

The fishermen, when they state so in the most positive manner, believe they are speaking accurately. It can, however, be no more than opinion, in many cases based on most insufficient, or no data at all, while in other cases they have given, apparently, the most accurate accounts of having seen spawn washed up on the shore, which they had never seen before the trawling began; and in some cases men stated that they had seen it actually taken up by the trawl. The trawlers, one and all, denied having ever taken up spawn or anything resembling it.

In our Report for 1869 we referred to this question in the following extract:—

"One of the alleged reasons for the restrictions against this mode of fishing in the places where it was forbidden, was the injury it was supposed to inflict on line and some other modes of fishing. So far as we could ascertain, the interests intended to be served were not benefited by trawling being prescribed, while much injury was done to fishing enterprise, and the public deprived of a considerable amount of food. Another of the reasons given for preventing trawling was the damage it was supposed to cause to the ova of the fish, which, it was asserted, is deposited in bays and estuaries. The great preponderance of scientific opinion, however, appears to be, that if such deposit takes place, it is in such situations as cannot be affected by the action of the trawl. This was proved in the instance of the herring by the experiments made by direction of the Scotch Fishery Commissioners in the Frith of Forth.

"We believe that the herring was the only edible sea fish which, it is clearly proved, deposits its ova on the sea bottom.

"The report of Her Majesty's Consul-General for Norway for 1869, relative to the investigations of Professor Sars, goes far to support the opinion that, with very few exceptions, fish void their ova in the ocean, and that its development takes place while floating about. He states that—

"The ichthyologist, Professor Sars, who has devoted great attention to the fisheries, and ascertained at Lefsdalen during the fishing season, with a view to the study of the habits, and natural instincts of the cod and other fishes, has lately published some notes on the spawning of sea fish.

"He declares that it is a mistake to imagine that sea-fish in general cast their roe at the bottom of the sea, that the contrary is the fact, that the operation of spawning takes place on the surface, and that the roe floats about during the period of development. He asserts, that not only the cod, but also the mackerel spawns in the same manner a short distance from the shore, and it is, he says, not unfrequent that you will find a variety of fish performing this operation at the time with the mackerel. Intermixed with the roe of the mackerel he declares he has seen the roe of six other kinds of fish, among these the gurnard (*pinnard*).

"In the spawn of the cod and mackerel each roe (egg) will be found to contain a drop of oil, which lessens its specific weight so that it is sustained on the surface.

"This drop of oil is present during the whole period of development. Even after the fry has emerged, the drop of oil will be found in the maternal shell.

"The mackerel, he says, can be distinguished by a yellow spot on the back of the eye not yet furnished with pigment."

"The theory of Professor Baird is not applicable to all fish, as it is well known that the herring seeks the shore and inner waters, and that the female fish deposits its roe safely amid the sand and gravel, where it is not easily disturbed."

"After full investigations in each locality we deemed it well to repeal the by-laws prohibiting trawling in Lough Swilly, Belfast Lough, and the estuary of the Keshmere River."

In the report of the American Fish Commissioners for 1878, Professor Spencer Baird, states:—

"The eggs have a specific gravity of 1.030 to 1.035 as indicated by the fact that they float in salt water, and sink rapidly in fresh. The oldest fishermen had not the slightest idea of this fact, but held to the idea that the females deposited their eggs on the rocks, where they were visited and impregnated by the males, and left to become the food of the various animals so abundant in such localities. They had at times noticed the little transparent globular bodies in the water, but it had never occurred to them that they were the eggs of any fish. They may be found at the surface in common with eggs of the pollack, haddock, and probably other species of the cod family, when the sea is smooth; but when the water becomes rough they are carried to a depth of several fathoms by the current, though the tendency is to remain near the surface."

Since then the Royal Commission, before referred to, reported in 1885 on the subject; and from their Report we quote the following extracts:—

"In a great number of instances unsubstantiated assertions were made as to the destruction of spawn by the passage of the trawl. This destruction was said to be caused by the pressure of the lead lines and ground rope on ova lying at the bottom of the sea, or by the death of ova, consequent on their being raised to the surface in the net."

In support of the view, that injury is done to spawn by trawling, many fishermen spoke to having seen, or heard of large quantities of spawn brought up in the trawl.

"The fact of spawn in any quantities being found in the trawl net was denied by those witnesses who gave evidence on behalf of the trawlers, and Professor Ewart stated that only on one occasion had he seen herring spawn brought up in a trawl net on the east coast."

"Nothing can be clearer than the statements of Professor McIntosh on this point; although his experiments were limited to particular districts, the grounds travelled over varied in character, and may be fairly taken as fairly representative of the waters and trawling grounds of the north-east coast of Great Britain."

Professor McIntosh, in his report to the Commissioners, states:—

"No failure was more remarkable in the inquiry than the rarity of fish spawn (eggs) in the trawl, notwithstanding the careful search for such on every occasion. Out of a total of 58 hauls, fish eggs were obtained only on one occasion, in the shape of three small masses of herring eggs, adhering to a common acolyte (*Hydrotusca felata*). This occurred on ground ("Long Forvie," S.E. of the Island of May) not usually frequented by trawlers, but rather by the liners. The trawlers either do not seem to work on the ground selected by the herring for spawning, probably because the latter would prove too rough, or the passage of the trawl over such is unattended with the presence of ova in it. I am indeed inclined to think that the trawl is almost innocuous so far as the ova of fishes is concerned. Even if a trawl did pass over masses of herring ova, it is questionable if injury would always occur."

"While the eggs of fishes were so extremely rare in the trawl it was otherwise with the upper regions of the water. They do not occur quite at the surface, and hence the earlier work with the tow-net was unsatisfactory in this respect, only a few herring scales being found in the net especially during the rough weather of the winter months. As soon as the tow-net was sunk sufficiently deep, abundance of various ova of food fishes was obtained. Towards the end of March, indeed, it was apparent that several of the fast fishes, such as the long rough and common dab, had discharged or were discharging their ova, and these in all cases floated on the surface of the water in a glass vessel when in a perfect and living state. The same features were noted in haddock in process of spawning, as well as in cod."

"In the beginning of April (8th) no floating ova were found close inshore in Aberdeen Bay, but off the great fishing ground of Smith Bank they were in vast numbers, ten to twenty miles from land, together with young fishes, bearing a large yolk-sac and others in which this was nearly absorbed. The whole area was one vast hatching pond, and the other forms of life consisted of swarms of minute crustaceans (Copepods), Nauplius, and Ecos-stages of other forms, along with Sagittas. Some of these ova (e.g., haddock and gurnard) were larger than those of the cod, but they were few in number; while a fourth series were smaller than any yet mentioned."

"When placed in a vessel of sea water, the ova persistently floated on its surface, descending only a very little when the jar was rapidly shaken. After landing at Blackfoll and undergoing a protracted railway journey, without special arrangement, many ova were found on the bottom, and these were mostly dead, the early forms showing an uneven margin round the germinal area, with detached globules and cells. All the floating eggs were living."

The Commissioners say:—

"There is no room to doubt that the eggs of cod, haddock, and many of the most valuable food fishes (herring and sprat being the most notable exceptions) do not adhere to the bottom, but are found floating or in suspension in the water, and are matured in that position, and therefore that the notion entertained by fishermen, generally, that the beam trawl is destructive to cod and haddock spawn is an entire mistake."

Subsequently the Scotch Fishery Board, on the recommendation of the Commissioners mentioned before, was granted a sum of money, annually, for the purpose of conducting scientific experiments on the subject. These have not been sufficiently long in operation, we believe, for any general conclusion to be arrived at.

The Scotch Board has been afforded the assistance of some of the most experienced scientists of the day, and a steamer specially provided for the purpose of such investigations.

With regard to the question of spawning of fish, we therefore look for important information being, bye-and-bye, obtained.

DESTRUCTION OF IMMATURE FISH.

The allegations that large quantities of the fry of fish are destroyed by the trawl will, we believe, be found to be a more important factor in determining this question of injury done by trawling. Complaints are made of the capture of codlings, small flat fish, and immature fish of every description by the trawlers. Wherever line fishing is carried on, the same thing will be observed to occur, and in many places where we received evidence of large captures of soles by lines, it will be found they were generally of a small size.

In some places it has been stated that small fish, and in the largest quantity, are taken in the shallow waters; while in others, that the largest flat fish are got in the shallow, and the smallest, and in the largest quantity, are got in the deep waters. This can only be determined by practical experiments.

Those being carried on in Scotland, however valuable they must be, can never determine this question in the bays of this country, nor, even in Scotland, will it be found, we believe, that the same rule obtains in all bays. We have been informed, on reliable authority, that, in at least one of the firths in Scotland, immense quantities of fish, chiefly plaice, have been found of large size—about twenty to twenty-two going to a box of seven stons weight—and no small ones. There is no doubt that small, unsizable, and unmarketable fish are captured by the trawl, in the deep as well as shallow water. The largest quantity, we believe, is taken in the latter, though it has been solemnly asserted by trawlers in some places that they take the largest quantity outside, or in the deep water. Some assert that it is in about the same proportion in both places.

The experiments carried on by us during a certain number of days in each month extending over four years in Galway Bay, showed the following result:—

Description of Fish taken.	Number Sizable.	Number Unsizable.	Description of Fish taken.	Number Sizable.	Number Unsizable.
Turbot,	315	2	Whiting,	7,338	352
Bril,	337	—	Mackerel,	12	2
Sole,	3,437	56	Bream,	20	—
Plaice,	9,117	264	Scad,	2	—
Flounders,	2,655	3,771	Cuttle,	—	75
Gurnard,	9,922	3,264	Crabs,	3	405
Ling,	85	7	Scallops,	13,858	—
Hake,	5,229	169	Cod,	227	—
Doory,	194	164	Osgoues,	162	—
Ray,	927	1,637	Bass,	3	—
Pollock,	150	89	Mougrims,	354	161

The quantity of unsaleable fish during 100 days' trawling in Galway Bay, it will be seen, was inappreciable. This might not hold in other bays. Different results might and would, we have little doubt, be obtained at certain seasons and places.

On this matter the Royal Commission, referred to before, reported.

"The evidence on this point of the fishermen and trawlers, has been very conflicting. The fishermen assert the quantity of immature fish taken in the trawl to be very large and far in

"excess of anything observed by Professor McIntosh. * * * * *
 "It appears from the evidence of Professor McIntosh, that numbers
 "of immature fishes were brought up by the trawl not during his experiments, but that of the
 "more valuable kinds, such as haddock, whiting, and cod, the quantity was insignificant."

Professor McIntosh, in his report to the Commissioners, says:—

"The number of immature fish unfit for the market was insignificant. * * * * *
 "It is clear at any rate that the very young cod are not interfered with by the steam trawlers,
 "apparently frequenting the region close inshore, or escaping from the net before it is brought on
 "deck. A few young haddocks, again, have occasionally been found in the trawl entangled in a
 "basket or other obstruction in the net. Their numbers, however, are unimportant, every haddock
 "brought up by the trawl as a rule being saleable."

No unsaleable flat fish appears to have been taken by the Professor in his experiments.

The Commissioners conclude thus:—

"We are of opinion that, while at times a considerable number of immature fish may be taken
 "in the trawl net, these, generally speaking, are not of the more valuable kinds of food fishes, and
 "that there is no evidence of any unnecessary or wasteful destruction of immature food fishes by
 "the use of the beam trawl."

DAMAGE TO LINES, &c.

As regards the damage done to lines and nets, though it has unfortunately occurred on many occasions, it is not of that magnitude or extent in Ireland which would warrant any restriction being placed on trawling. If the line men will buoy their lines properly, trawlers could eschew them in most cases. If they did injury, they should be compelled to compensate the owners for all damage and loss. This we believe could be effected, where the trawling vessel is known, with little expense to the fishermen whose lines or nets were damaged.

We have now dealt with the five points on which complaints against trawling rest:—

1. Decreasing the supply of fish;
2. Disturbance and exhaustion of fishing grounds.
3. Disturbing and destroying spawn;
4. Destroying fry or immature fish;
5. Damaging lines, &c.;

and, to sum up shortly, beg to report our opinion—

As to No. 1. That the decrease in many instances has not been satisfactorily proved—that where it is alleged, as in Dublin Bay, the supply of fish does not exist, experiments should be made by a steam trawler from time to time to test the accuracy of the statements, and that a more extended system of taking statistics than at present in existence should be adopted.

As to No. 2. That no accurate conclusion can be arrived at; but that trawling vessels should not be allowed to come within three miles of boats drifting for herrings or mackerel.

As to No. 3. That we must wait till the scientific experiments being made in Scotland are completed before a satisfactory conclusion can be arrived at.

As to No. 4. That this should be tested in different bays in Ireland at different seasons by means of trawling, under our supervision.

As to No. 5. That up to the present any damage done is not such as would warrant a restriction on trawling, and that, whenever it occurs, the trawlers committing the damage should be compelled to compensate the owners who have suffered loss.

This vexed question of trawling has occupied the attention of Commissions of Inquiry in Ireland in 1836 and 1866, and on the present occasion, and a Select Committee of the House of Commons in 1867—besides several Commissions on the same subject in England and Scotland.

In 1836 the Commissioners reported as follows:—

"There is no part of the present investigation more beset with difficulties than to ascertain the point to which the Legislature is bound to restrain the fisherman in the exercise of his art, with reference to engines and to practices deemed dangerous to the preservation of the breed of fish. It is here, that evidence fails altogether to satisfy the mind; scarcely a single fact being advanced which is not positively contradicted by equally respectable testimony. The validity of any doctrine on these subjects reposes on facts in the natural history of the animal to which it refers; and the habits of fish are very little known, even to the best writers on ichthyology. In almost all such questions conflicting interests are engaged, and complaints are most commonly directed against the practice of rivals. It occurs likewise that when any particular fishing has ceased to be productive, the minds of the sufferers go, as it were, on a scrutinizing inquiry, in search of a plausible cause for explaining the phenomenon; and then, the imagination eagerly seizes upon some circumstance by which a rival exclusively profits. The rival too, necessarily strives to justify his own practices; and thus what one party asserts, the other strenuously denies. All these doubts and difficulties especially haunt the question of trawling, a practice which the whole body of line fishers are anxious to suppress. Of the trawl it cannot be doubted, notwithstanding much contradictory statement, that the produce is abundant, and obtained with comparatively little labour; in short, that it is an effective instrument—in so far tending to bring down the price of fish, and to depress the condition of those who use inferior methods. To this cause, some part at least of the complaints must be attributed with which its use is assailed.

"The opinions against it, whether founded or otherwise, are prevalent along all parts of the coast, as well where that engine is not used, as where it is employed.

"It may also be inferred that if the trawl had really diminished the stock, it would already have been abandoned; for even trawlers could not work remuneratively where the fish are not."

The Commissioners in 1866 reported as follows:—

"Beam trawling in the open sea is not a wastefully destructive mode of fishing, but is one of the most copious and regular sources of the supply of eminently wholesome and nutritious fish. Any restriction upon this mode of fishing would be equivalent to a diminution of the supply of food to the people; while there is no reason to expect present, or future benefit from that restriction."

The Select Committee of the House of Commons in 1867 reported as follows:—

"RESTRICTIONS ON FISHING.

"The inquiries of your Committee on this point were chiefly directed to the subject of trawling in bays and estuaries.

"They found the prohibition against this mode of fishing existing more or less in most of the bays and estuaries in which it could be successfully carried on.

"Owing to the prevention of trawling in certain places it appears that large quantities of fish frequenting bays and estuaries, which can only be captured by that mode, are lost to the consumer.

"Your Committee, therefore, recommend that after the expiration of one year after the passing of the proposed Act, the existing regulations imposing restrictions on all modes of fishing, except bar systems, should cease, reserving however to the Board, after due inquiry, and subject to the approval of, and appeal to the Lord Lieutenant in Council, the power of making such restrictions and other by-laws as may be deemed necessary."

Notwithstanding all these inquiries, the question is as unsettled now, as it was more than fifty years ago. The time has, however, arrived when, in our opinion, the necessary investigations, which we have the honour to submit for your Excellency's consideration, should be undertaken, not only for the preservation of peace and prevention of disputes amongst the different classes of fishermen; but for the all-important discovery of facts, which might lead to the improvement of the fisheries and the general public weal.

We cannot conclude this report without informing your Excellency that anticipating a more favourable view of the case from the Lords of the Treasury we had been in correspondence with Professor Cossar Ewart, of Edinburgh, who is conducting the scientific experiments for the Scotch Fishery Board, and submitted to him a series of queries on which he was good enough to give us full information.

We have since had frequent communications with him and the Chairman of the Scotch Fishery Board, and have had from them as much information as correspondence would allow. Obviously, it would be next to impossible to gain as much by correspondence, almost on any subject, but more particularly on this intricate one, as could be attained by conferring occasionally when particular questions arise, and which we submit we ought to be enabled to do.

We have collected from the Reports of the Scotch Fishery Board for the years 1885, 1886, and 1887 (App. I), as also from the statement by the Scientific

Report Committee of the same Board, on the scientific work carried on during the six months—April to October, 1888 (App. 2)—some extracts bearing on these questions as well as extracts from a letter from the Resident Director of the Marine Biological Association of the United Kingdom (App. 3), which are of considerable importance, as showing what is at present being done in Scotland and England.

If similar investigations were carried on in some bays in Ireland, and interchanges of observations, ideas, and opinions effected, most important results to the fisheries of the three kingdoms might follow. The physical conditions and circumstances of bays and coasts differ materially, and what may be applicable to one would be wholly unsuitable for another place. Every practical fisherman of any knowledge or experience is aware of this, and this leads him to migrate at different seasons to different places in quest of a fish harvest.

We have once more to express to your Excellency our earnest hope that authority may be given to us to take such steps as may be necessary for the investigation of this subject in the different bays in Ireland, and that for this purpose a sufficient sum of money may be included in the estimates for this Department. This has been rendered the more necessary now, in consequence of the Act of last Session which provides that your Excellency in Council shall have power, on receiving a petition signed by two-thirds of the owners of Registered Boats, praying that trawling may be prohibited, and which prayer we may have refused to grant, to direct that the prayer of the fishermen or a portion of their demands may be acceded to, and trawling be prohibited within certain limits.

Already Committees of the Privy Council have heard two cases in which we had refused to grant the prayer of the fishermen, viz., Galway Bay and Lough Swilly. In the former they upheld our decision, and in the latter they allowed the case to stand over for further consideration. We believe these cases have exemplified the very difficult and complicated nature of the questions to be decided, and that they never can be satisfactorily done save in the manner represented by us to your Excellency.

With respect to your Excellency's instructions of the 26th February last, to ascertain the practice in England and Scotland as regards experiments in connection with trawling, the cost that is being incurred, &c., and report generally what is being done in Great Britain, we beg to report for your Excellency's information, that, in Scotland observations and investigations are being carried on by the Scotch Fishery Board, assisted by some of the most eminent scientists; that a special steamer has been provided for the purpose, at a cost of about £3,000, in addition to the vessel permanently attached to that department, and the assistance given by some of Her Majesty's vessels by the Lords of the Admiralty. In the estimates for the Scotch Fishery Board the following votes appear:—

	1885-6.	1886-7.	1887-8.	1888-9.	1889-90.
For Scientific Investigations, . . .	1,800	2,000	2,000	2,000	2,000
For Cutter and Boat Service, . . .	2,295	3,415	3,515	3,315	3,615

In reply to our inquiry from the Board, we have been informed that the cost of experiments relative to trawling in Scotland is about £1,000 a year, that the experiments are conducted on the same general lines as before; and that, at present, it was impossible to indicate the results of the operations during last year, but that they would be given in detail in the Board's forthcoming Annual Report which was in course of preparation.

As regards England, no experiments relative to trawling are being made.

The Board of Trade are not empowered by law to prohibit or restrict trawling, but under the 51 & 52 Vic., c. 54 (Sea Fisheries Regulation Act, 1888), local fisheries' committees will be able to make by-laws restricting or prohibiting any method of fishing for sea fish within the limits of their respective districts. Several complaints have been received by the Board of Trade against inshore trawling since the Report of the Royal Commission on Trawl Net and Beam Trawling was published.

The Marine Biological Association of the United Kingdom has been established at Plymouth. The votes on the estimates for it are—for 1886-7, £2,500; for 1887-8, £2,500; for 1888-9, £500; and for 1889-90, £500.

In reply to our inquiry we have been informed, under date 13th March, 1889, as follows:—

"The Association has hitherto confined its experiments to the observation of the time, manner, and locality of reproduction of the more important kinds of food fish, including such trawl fish as the sole, the plaice, flounder, mackerel (*Scomberus mercurius*), &c. Especial attention has been given to the artificial propagation of these fish with the view of showing how depleted fishing areas may be restocked. The observations are necessarily incomplete, since the laboratory was not finished, and the apparatus necessary to the purpose was not in place last year, and this year's breeding season is as yet young. Practically it has been found that the ova of the plaice, flounder, mackerel, and other common kinds of flat fish may readily be obtained from the ripe females during the months of February (plaice and flounder), and March (mackerel), they are easily fertilized and the larva may be hatched and reared up to a certain stage in a very simple apparatus. The difficulty arises after the larva has absorbed the yolk-sac. They then require food, and the Association has not succeeded in feeding them. Consequently, several thousand of plaice and flounder have been lost this year. The Association believes that the best results would be obtained by turning out the larvae when hatched into a tidal basin in which they would have a chance of obtaining their natural food, but the Association does not despair of rearing them still further in a 'hatchery,' as it has been done in Norway. The sole is now beginning to breed on these coasts. It is not difficult to get roe from the female sole, but there is great difficulty in fertilizing the ova.

"The testes of the male sole are very small, and it is curious that they never appear to be ripe when the females are shedding their spawn.

"Mr. Cunningham, the naturalist of the Association, succeeded last year, with great difficulty, in fertilizing a few sole's ova, but they perished for want of proper apparatus before their development had proceeded far. The Association is now devoting its energies to the study of the reproduction of the sole. The reproduction of the turbot, brill, or halibut has not, as yet, been made a special study. The last named is uncommon here, and as the working staff of the Association is very small as yet, the Association has to limit its energies. No separate account is kept of the expenses of experiments on the separate species. The forthcoming number of the Journal of the Association, which will shortly be published, will give more detailed information on the reproduction of fishes."

The Journal of this Association, referred to in this letter, has been delayed through unforeseen causes, and has not therefore been published up to the date of this report.

We have the honour to be,

Your Excellency's most obedient faithful servants,

THOMAS F. BRADY,
ALAN HORNSBY,
JOS. HAYES.

Dated at the Office of Irish Fisheries,
Dublin Castle, 15th April, 1889:

APPENDICES

APPENDIX No. 1.

EXTRACTS from the REPORT of the FISHERY BOARD for SCOTLAND for 1885.

In reference to the By-Law made by the Board to prevent Beam Trawling in certain in-shore waters, they say:—

"The Board, in order to be in a position to undertake the experiments referred to, in the event of the by-law being confirmed, applied to the Lords of the Treasury for funds to enable them to purchase a small vessel for travelling and provide the requisite appliances and assistance. In response to this application, the Treasury agreed to place a sum of money on the estimates to be laid before Parliament which, in addition to paying for a steam tender, will admit of the operations being carried on throughout at least the first half of the present financial year. With part of this money the Board have purchased a small steam vessel (the 'Garland') which, as soon as fitted out as a trawler, will be utilised for making a systematic examination of the enclosed waters. This work will in great part consist in travelling along certain fixed lines in the several areas at stated intervals throughout the year. On each occasion, the contents of the trawl-net will be carefully noted, so that the takes may be compared from month to month, and from year to year, both while the by-law is in force and after its repeal. In addition to this travelling work if sufficient funds are provided, observations will be made as to the abundance of eggs and young fish at various depths throughout the year; the influence which the presence of crustaceans and other forms has on the number of food fishes at any given time; and further, large numbers of artificially hatched fish will be introduced into the enclosed areas to ascertain whether the yield of the in-shore waters can be increased, and also if it is possible to determine when the more important food fishes reach maturity."

"The two vessels in the service of the Board, employed in carrying on superintendence at sea during 1885, were H.M.S. 'Jackal,' commanded by Lieut. J. R. Pickett, and who was succeeded in the course of the year by Lieut. J. W. Osborne, with her tender 'Daisy,' and the 'Vigilant' Cruiser, commanded by Mr. Alex. McDonald. To these vessels were added by the Lords of the Admiralty, during the great East Coast summer herring fishery, H.M. gunboat 'Firm,' Lieut. George Inis in command, H.M. Cutter 'Eagle,' Mr. Henry Miller in command, and H.M. Cutter 'Active,' Mr. W. Sherlock in command, tenders from the Loch Guard Ship; also H.M. gunboat 'Firefly,' Lieut. Robert Bruce in command, and subsequently H.M. Cutter 'Adder,' Mr. Robert Soome, in command, from the Hull Guard Ship."

EXTRACTS from REPORT for 1886.

"The steam tender 'Garland,' mentioned in last year's report, was purchased and provided with a trawl, dredges, and other appliances. After preliminary trials, the regular travelling operations were begun on the 16th June, and continued to November, when the travelling part of the work had to be suspended for want of funds."

"The 'Garland' travelled periodically over twenty different 'stations.' Nine of these stations are in the Forth district, five in St. Andrew's Bay, and six in Aberdeen Bay. The position of the Forth and St. Andrew's Stations is indicated in the chart (Plate I.), Appendix, page 60, and the number and kinds of fish captured are given in table A, page 61."

"In the absence of previous data, it is not yet possible to arrive at any conclusions as to whether fish are increasing at any of the stations under observation. It is evident that each month of each year will require to be considered separately, and attention paid not only to the numbers of fish taken, but especially to the conditions under which they are captured."

"The evidence already collected seems to indicate that, by regulating trawling in the territorial waters, they will in course of time yield more mature fish and serve as nurseries and feeding grounds during certain months of the year for shoals of herring, haddock, cod, and other valuable fish."

"The new 'Jackal' has been fitted with a deck-house, containing a laboratory and sleeping cabin with three berths, and all the usual fittings, so as to enable her to assist in investigating the fishing grounds said to exist off the Outer Hebrides, but she is not in all respects suitable for scientific work."

EXTRACTS.—REPORT ON THE TRAWLING EXPERIMENTS ON THE EAST COAST. Part I.
—Preliminary. By Professor J. CORNER EWART, M.D., and Sir JAMES
RAMSAY-GIBSON-MAITLAND, Bart.

"The bye-law having been passed and confirmed, it was necessary to make arrangements to discover, if possible, what influence the prohibition of trawling would have in leading to an increase of fish in the protected waters. At the outset it was evident that it would be necessary to make systematic observations on the various areas by trawling along the same lines, and as nearly as possible under the same conditions, as the ordinary steam trawlers; and further, that it would be equally necessary to obtain, as far as possible, a record of the fish captured day by day from the various grounds in the Firth of Forth, St. Andrew's and Aberdeen Bays.

"Accordingly representations were made pointing out that a small steam vessel, provided with trawling gear and other appliances, was indispensable.

"An application for a sum of money to purchase and maintain a trawling vessel was made by the Board to the Secretary for Scotland (His Grace the Duke of Richmond and Gordon, K.T.), and after full explanations were made by one of us (Professor Ewart) the sum of £3,000 was placed on the estimates for the purpose. After due inquiries had been made, the steam fishing yacht 'Garland' was purchased from Mr. Woodall, of Scarborough, for the sum of £2,500. To save time as far as possible, the above negotiations were begun soon after the bye-law was made, and a few days after the bye-law was confirmed the 'Garland' reached Granton, in order to be fitted out for the trawling experiments contemplated.

"The 'Garland' is an iron fishing yacht with auxiliary steam power. She was built in 1880 at Dumbarton; her length over all is 92 feet, breadth 15 feet 10 inches, depth 8½ feet, and she is rigged as a fore-and-aft schooner.

"Before beginning the trawling and other work it was necessary to provide the vessel with a steam winch, trawling gear, dredges, &c., and later it was found desirable to add a small bridge to admit of a better 'look-out' being kept when at work during the night in the vicinity of small fishing boats, often imperfectly protected by lights. The beam of the trawl provided is 25 feet in length, i.e., about half the length of those used by the ordinary steam trawlers. This size was selected partly to suit the weight of the ship, and partly to cause as little disturbance as possible to the fishing grounds when under periodical inspection.

"Arrangements for carrying on the Work."

"As it was necessary that the trawling operations should be carried out in a thorough and systematic manner, and that all the areas should be studied in relation to each other as well as separately, it was thought desirable to place a naturalist on board the 'Garland.' Mr. Calderwood, who had already gained considerable experience in dredging and trawling work in the Moray Firth and in Loch Fyne, was selected for this post.

"After the winch and other fittings had been completed, and several preliminary trials made, the 'Garland' was reported on the 15th June as ready to begin the regular trawling and other operations. While the 'Garland' was being adapted for her unique mission, we had under consideration how the work should be carried on. This was a difficult problem owing to the areas selected differing greatly from each other. The Forth, e.g., consists partly of water undergoing constant variations, and partly of water in which the conditions from top to bottom remain almost unchanged. In St. Andrew's Bay, on the other hand, there is no true estuary at the mouth of the Tay, no piece of water corresponds to that which in the Forth lies between Inchkeith and the sea; and Aberdeen Bay differs from both, for there is attempt at an estuary, the fresh water running directly into the salt without altering appreciably the bottom salinity. Further, while Aberdeen and St. Andrew's Bays are almost entirely floored with sand, which gradually approaches the surface towards the shore, the bottom in the Forth consists of a series of banks and depressions of a most irregular character, some of them composed of mud and sand, others chiefly of shells and gravel.

"After gaining all the information available from fishermen and others, we came to the conclusion that, for our experiments, the 'Garland' should periodically trawl over nine separate fishing banks or stations, in or near the Firth of Forth.

"In St. Andrew's Bay we ascertained that it mattered little which lines were selected for trawling, there being no special fishing banks where the same vertebrate and invertebrate forms are invariably found. The same applies to Aberdeen Bay, hence in laying down lines we considered chiefly how the various portions of the bays might be most effectively tested. In Aberdeen Bay six stations were selected which have a similar disposition to those in St. Andrew's Bay.

"Mr. Calderwood, on joining the 'Garland,' was instructed to superintend the trawling and dredging operations, the collection of surface forms, preservation of specimens, taking of temperatures, and especially to note carefully and accurately the number and size of all the fish captured by the trawl from the various stations which had been selected for observation.

"Special forms were prepared to admit of a complete record being kept of the fish taken by the trawl, dredge, and tow net, and of the temperature, state of the weather, &c. The 'Garland' was supplied with charts, showing the extent and direction in which the trawl was to be carried in working over the various trawling stations, and with several books of reference, bottles, tanks, &c., for the preservation of spawn, young fish, crustacea, and other objects which required to be afterwards examined or identified. Recently a complete set of thermometers and other instruments for making physical observations have been provided, and the necessary instructions given for their use.

"The 'Garland' having been equipped and manned (the crew, consisting of a master, two fishermen (one an experienced trawler), an engineer and stoker, an ordinary seaman, a steward, and a boy), began the regular trawling work, on the 18th of June."

"The 'Garland' having been fitted out, we next directed our attention to the collection of statistics showing the daily take of fish within and in the vicinity of the closed areas. This proved an extremely difficult matter to arrange, as, to render the statistics of any real value it was necessary to learn as nearly as possible where the fish were captured, the size of the boats, the kind of bait, the nature of the weather, and also the size and condition of the fish. It was obvious that this work could not be undertaken by the District Fishery Officers, hence at the outset it was necessary to appoint a 'correspondent' at the various stations from which boats fished in the closed waters.

"With the assistance of the Fishery Officers of the districts, we at last succeeded in completing the arrangements for the Firth of Forth and St. Andrew's Bay, from which we are now receiving daily returns, showing the number of the fish captured, size of boats, &c."

"In instituting this inquiry, it was necessary to consider carefully the three partially protected areas from every point of view, and to ascertain as far as possible which fish are in the habit of visiting them either in search of food, shelter, or spawning grounds at the present day. Although there are a considerable number of food-fishes in our waters, it is only necessary to direct special attention in an inquiry of this kind to those which are largely used as food either in a fresh or in a preserved state."

"It may here be mentioned that as an indication that the firths and bays and territorial waters generally have yielded large supplies of fish, the fishing boats until comparatively recently were with few exceptions small and undecked, and although the boats are now much larger than they were, none of the great fishing stations can yet boast of a fleet of schooners, similar to those at Grimsby or other English fishing centres, or at Gloucester and Boston in the United States. Scotland is certainly largely interested in the fisheries, yet her fishermen are practically unable to compete with the English great fleet on the fishing banks of the North Sea. The English and American fishing schooners are sufficiently large to make a cruise of several weeks duration to the great fishing banks, but our fishermen are at the least, owing to the size of their boats, only able to glean in a hurried fashion the banks from which the English vessels reap an abundant harvest."

"Sufficient time has not yet elapsed since the passing of the bye-law to admit of definite conclusions being arrived at. In the present Report it would therefore be premature to discuss at length the results likely to follow the prohibition of trawling in the territorial waters. As the experiments will require to extend over several years, the public interest will be best served if in the meantime we indicate generally the physical and biological conditions of the Forth and St. Andrew's Bay, as far as they have been ascertained, and append the statistics collected, which are likely to assist in throwing light on the influence of trawling and other modes of fishing in diminishing the number of fish in the territorial waters."

"In considering firths into which a large river enters at the one end while the other is in free communication with the open sea, the salinity of the water is of great importance in influencing the movements of the fish and their food, and also the development of both ova and young fish."

"However sensitive ordinary fish may be to changes in salinity, they are apparently still more sensitive to changes of temperature."

"If there is a difficulty in collecting reliable statistics of ordinary imports and exports, still more difficult is it to collect trustworthy statistics of the fish landed at the various fishing stations around the coast. This difficulty all nations are familiar with, and certainly no country has hitherto succeeded so well as Scotland in collecting fishery statistics."

"While the total quantity of fish captured around the coast throughout the year has a certain national interest (in as far as it enables us to estimate in a general way the value of our fisheries), it has no scientific value. Statistics, to be of any real use now or in the future, must show, not only the quantity of fish caught at any given time, but also, as accurately as possible, the place where they were captured, the number of boats fishing, the bait used, the size of the boats, state of the weather, condition of the fish, &c. Hitherto, we are not aware of any attempt having been made on a large scale to collect statistics on the above lines. In order to obtain complete and accurate statistics it would be necessary for each boat around the coast to keep a day book, indicating not only the fish captured, but also the ground fished over, the state of the weather, value of the fish, &c. An experiment in this direction we have recently made. Some fifty fishermen were good enough to consent to fill up books provided for the purpose, and return them once each month to be checked and copied. The takes of several boats fishing on the same ground year after year might be extremely valuable, and there is no reason why each boat should not keep a careful record of her takes; were this done, many questions of great interest would in a few years be finally settled, and our knowledge of the movements of fish would be considerably increased."

"The sea is ever changing, and its inhabitants, especially the shallow water and surface forms, are more or less influenced by these changes. Further, fish seem naturally to move to and fro, some wandering over wide areas, while others are limited in their migrations. It may be taken for granted that fish are less capricious and less migratory than has been generally supposed—that, in fact, led by instinct or by experience, they only change from one place to another when some good to the individual or the species is likely to be gained. Hitherto the fishing boats when in search of shoals have, like the fish, been directed more by instinct than reason. Nevertheless, the experienced fishermen know most of the resorts of fish at the different seasons, but their information requires to be tabulated and tested."

"Taking for granted fish are abundant on a certain bank, many things may prevent their being

captured. In the first place, the fishermen may fail to discover the particular bank. It was only in 1842 that the Silver Pit was discovered,—the 'pit' where the sole and other flat fish congregate in immense numbers in winter;—yet this sheltered spot has probably served as the winter quarters of the sole for centuries. Again the bottom feeders may be engaged spawning near the surface, or the surface feeders may be spawning at the bottom. The other day, *e.g.*, of 56 cod taken in a trawl off the May, there was only one female, the other females of the shoal having either left for the off-shore spawning banks or taken to swimming nearer the surface preparatory to shedding their ova. Again, the take may be small owing to the bait used, the size of the nets, the state of the tide, or the condition of the weather or sea.

"Apparently, both in St. Andrew's and Aberdeen Bays, the flat fish often find the inshore ground so unpleasant during storms that they with common consent move seawards. If the trawl is carried along at a given line one day when the sea is still, hundreds of flat fish may be readily captured; but the same trawl, taken over the same ground some days later when the sea is rough, may fail to secure a single fish.

"Although only a year has elapsed since the bye-law was passed providing for a limited form of protection for the waters referred to, there is already some signs of improvement both in the number and size of the less migratory flat fish, and in the number of young round fish which visit the territorial waters for long or short periods.

"The fishermen of the Forth and St. Andrew's Bay state they are already obtaining better takes of flat fish, and that they believe in a few years the in-shore grounds will have recovered to a considerable extent their former richness. Mr. Mair, the fishery officer who takes charge of St. Andrew's Bay, in a letter dated the 29th March, 1887, reports that 'in the month of January last 4 year 89 cwts. (of flat fish) were caught, but none in February, while during January and February of the present year (1887) 1,368 cwts. were landed, the largest take during these two months that has been recorded for ten or twelve years.'"

EXTRACTS FROM REPORT FOR 1887.

"The means adopted have consisted—

1. In inquiries carried on by a Committee of the Board at various parts of the east and west coasts.
2. Investigations by means of the steamer "Garland," into the actual condition of the fishing grounds.
3. The collection of special statistics relating to the operations of fishermen and trawlers along the east coast."

"The system adopted in order to test the condition of the fishing grounds since the suspension of trawling was described in the Report of last year, but we may briefly state that it consists in the selection of certain fishing grounds within and beyond the restricted waters, a careful survey of their physical condition and of the nature and amount of the invertebrate life in their waters and on the bottom, and periodically ascertaining the relative abundance of fish by means of the 'Garland's' trawl. Serial observations are at the same time made with reference to the organisms floating in the sea, so important in their relation to the food of fishes, and on the temperature and physical conditions of the sea and atmosphere, which bear directly on the movements of fish."

"Immature Fish captured by Trawl and Hook.—The question of the respective numbers of immature fish killed by the various methods of fishing is one of great importance. We are endeavouring to ascertain by scientific methods the comparative destruction of such fish by the trawl and hook, and the information already obtained is of much interest."

"Our knowledge of the precise point at which it may become perilous to the yield of future seasons to kill a certain proportion of young fish is not yet very clear, and we have no data to show the relation between the size of each kind of fish and the occurrence of sexual maturity; although we hope soon to acquire some definite information on the latter point at least. It is obvious, however, that it would be difficult to prevent the capture of immature fish by the hook, since the principle of this method of fishing is the action of a lure, which is apparently equally attractive and destructive to the young and old. Of late years the line fishermen, owing to the needs of railway extension, and the increased demand for fish, have directed their attention to capturing small fish also, which were previously unmarketable. Furthermore, the kind of fish taken by the hook must be considered, for round fish in their distribution are not so limited to the waters immediately adjacent to the coast, while the majority of young flat-fishes are taken by the trawl. The trawl, on the other hand, is essentially mechanical in its mode of operation, and it would be very desirable if some method could be devised to diminish the number of small fish thus captured."

"A point of importance in dealing with the question of beam trawling is, that trawlers capture, on the whole, a different relative proportion of fish from those obtained by line fishermen. A reference to the tables (p. 127) shows that while the former obtain large quantities of haddock they capture flat-fishes in relatively greater quantities and it is by their labours that a considerable supply of such fish are got. It is, however, noteworthy that, despite their exemption from certain inshore areas, they landed larger quantities of fish last year than they did before these

waters were closed. There therefore seems evidence to show that the spheres of trawlers and line fishermen differ in many respects, and that by some measure of regulation, according to local conditions, the two modes might be simultaneously prosecuted with the best advantage. From the peculiar nature of the inshore grounds, especially in regard to their function as the great nursery of fish, it is necessary that particular care should be exercised as to the modes of fishing practised within the territorial waters."

"So far as the result of protecting certain waters is concerned, it appears that there has been generally an increase and no decrease in these waters, while in those outside, the increase has not been either so general or so constant. The numbers of small fish seem to have been largely augmented. The relative quantity of the fish taken by line and beam trawl is discussed below, and has been previously referred to. While the line fishermen haul by far the greater proportion of round fish such as cod, ling, and whiting, the trawlers land considerable quantities of flat-fish, with the exception of halibut, which are almost all taken by the line."

"It is evident that by collecting accurate information of this kind for a few years, we shall be better enabled to comprehend and satisfactorily deal with many important fishery questions."

"Unfortunately, in the absence of similar statistics, it is impossible to ascertain with certainty whether the takes by line fishermen are increasing in ratio with the increase in the number of fishermen, and with the improved fishing appliances now employed; but it seems highly probable that the ratio is now much less than what it was before."

"It is evident that from the complexity of these questions, the difficulties in the way of their investigation, and the comparatively short time that they have been carried on, it would be premature to express decided opinions as to the data now obtained. When these data have become more numerous, it will be possible to sketch out the movements of each kind of fish, to determine the periods of greatest abundance, &c., and now that the Board has a properly equipped vessel in the 'Garland,' our knowledge of the movements, rate of growth, &c., of the food fishes will be rapidly increased, if the conditions for carrying on scientific work are at all favourable."

EXTRACTS.—REPORT OF COMMITTEE on the Scientific Work carried on in connection with the Fishery Board for Scotland.

"From the gradual but great increase in the prosecution of fishing, and from the vastly improved methods now adopted, it has resulted that particular fisheries in this and other countries have suffered injury, and in some cases have been threatened with practical extinction."

"In the recent re-organisation which has taken place in the fishery departments in the United States and elsewhere, it has been fully recognised that the causes of such deterioration, the means by which it might be arrested, and the yield and value of the industry improved, must be determined by scientific inquiries. Thus when some of the fisheries of the United States were suffering great depression and were threatened with annihilation, the Government of that country appointed the late eminent naturalist, Professor Spencer Baird, to inquire into the causes which had brought about such unfortunate results, and to take such steps as might appear in his judgment best adapted to restore them to their previous productiveness. The wisdom of this action on the part of the United States authorities in bestowing unfettered power on Professor Baird has been amply justified by the great improvements made in recent years in the fisheries of that country, and by the great increase of our knowledge as to the habits and life-history of the food fishes."

"Similarly, the scientific inquiries carried on by the German Commission in the Baltic have resulted in the accumulation of much knowledge regarding the German fisheries, and have formed a secure basis for legislative action for their permanent improvement."

"Again, in Italy there is a permanent Royal Commission of Fisheries composed of university professors and others, which examines into all questions connected with this industry; and recently stations have been established under the auspices of the Italian Government for increasing the number of fish by artificial means."

"In the northern countries of Europe, where fishing furnishes a livelihood for large numbers of the population, numerous investigations have been carried on with great zeal and success, and the discoveries of Professor Sars and the labours of Mr. G. M. Dannervig and others have been shown to be of great and permanent value. In Holland, also, the well-known naturalist, Dr. P. C. Hoek, who has done so much to increase our knowledge of marine zoology, has been recently appointed to the post of Scientific Superintendent of the Dutch Fisheries."

"It is not difficult to understand the reasons which have led the respective authorities to institute special departments for the purpose of carrying on systematic fishery inquiries. The Marine Biological Laboratory, recently opened at Plymouth, is a sign of the times. The Government has granted to this institution a sum of £5,000, and £500 a year, on condition that it conducts researches upon certain branches of fishery work."

"From the vast extent of the sea, the wealth and variety of its fauna, the fluctuations in its physical conditions, and the complexity of the influences which dominate the life and habits of fish and their food, it is evident that constant systematic observations are far more essential in this than in any other industry."

"The methods by which we have endeavoured to obtain such knowledge may be grouped under the following heads:—

"I. The study of the various modes of fishing, the appliances used, the influence which each of them is likely to exert upon the future supply, and how best their practical working may be improved.

"II. The systematic collection of special statistics, relating not merely to the total amounts and value of the fish landed, but to the areas where they are caught and the conditions under which they were obtained, their relative abundance, the proportions of immature fish, and many other particulars of importance.

"III. Inquiries into the life-history, reproduction, migrations, spawning processes, and the nature of the food and of the enemies of the various edible fishes; and, in brief, the study of fish as living creatures in the sea as distinguished from their consideration merely as articles of commerce.

"IV. Investigations as to their structure and development.

"V. The collection of data in regard to the action of physical influences upon their movements, food, &c.

"VI. Inquiries as to how far certain exhausted fisheries might be improved by artificial hatching or otherwise."

"The most important of the means by which the Board is enabled to carry on investigations into the fish fauna around the Scottish coasts consists in the possession of the 'Garland.' The ordinary cruises in the service of the Board were previously exclusively, and are still almost entirely employed in the police supervision of the territorial waters, and they are not well adapted to carry on scientific inquiries into fishery questions. The 'Garland' has already led to a great extension of our knowledge; and there can be no doubt that if the 'Jackal' had been better adapted to carry on fishery work our knowledge would have been still further increased."

"We have also had the use of temporary laboratories for the purpose of prosecuting inquiries into many points connected with the structure, reproduction, food, &c., of fishes, and for a short period the Rothsay Aquarium was at our disposal, where the spawning processes of the herring were for the first time accurately investigated, and many observations made upon the spawning and habits of other fishes."

"An important part of the scientific work has consisted in an investigation into the influence of continuous beam-trawling, especially in confined areas and inshore waters. Several inquiries by Government Commissions have been held on this subject, and while it was clearly shown that trawlers did considerable damage to the gear of fishermen, no definite conclusion could be arrived at as to the influence unrestricted beam-trawling was likely to have on the future of the fisheries. This uncertainty resulted chiefly from the unsatisfactory or contradictory character of the evidence available, and from the total absence of reliable statistics. Hence it was felt imperative in order to obtain definite knowledge on this important practical question that trawling experiments and the collection of accurate statistics should be instituted.

"Accordingly, the 'Garland' was purchased by the aid of a special sum voted for the purpose, and was fitted out with a steam winch, beam-trawl, dredges, and all other appliances adapted for marine exploration. It was essential to the success of these scientific operations that certain portions of the territorial waters should be set apart for experimental observation, and that beam-trawling should be for a time prohibited in these areas, so that comparison might be made as to the influence which the cessation of this method of fishing might have upon the abundance of fish, and upon the fish supply of future years."

"It is not necessary here to detail the methods and results of these investigations, since they are given in full detail in the Trawling Report of this and last year. Great care was, however, taken to make the experiments so far as possible correspond at the different stations, and the numbers of each kind of fish got were carefully recorded, their sizes measured, and the physical and climatic conditions of the station at the time examined. It is obvious, however, that in a question of such extent and importance, the investigations must be both wide in their scope and of some duration, before trustworthy conclusions can be arrived at.

"Nevertheless, the results already obtained closely justify the course adopted. A reference to the special report (p. 35) will show that since the prevention of trawling, a very great increase in the abundance of the fish in the protected waters has occurred, and this is true in every case of which we have statistics, and the results of the prosecution of line fishing have been as a whole considerably augmented.

"It is therefore evident that this mode of fishing, so far as the territorial waters and the partially enclosed waters of certain areas are concerned, requires careful and constant attention."

"Another course adopted by which much information has been obtained, has consisted in the collection of statistics relating to the great fisheries of the East Coast. As we previously mentioned such statistics usually deal almost solely with the trade aspects of fishery industries, and give no clue as to how the fisheries can best be managed and improved. The lack of such information has been again and again deplored by those who have taken part in fishery inquiries."

"The system which we have organised has already yielded much information respecting the comparative productivity of different portions of the inshore waters; also detailed accounts of the quantities of all the fish captured and their relative sizes by the various modes of fishing. We have further accurately mapped out, in certain districts, the firths and bays, and the waters lying offshore to the distance of some twenty miles, into equal areas (square miles), each of which

has a distinctive number, and hooks have been provided so that the fishermen may supply details of the position where their catches are obtained, the state of the weather, and of the tides, the condition of the bottom, and various other particulars which will enable us to localise the best fishing grounds, the relation of physical conditions to their yield at different times, and also to furnish details of the quantity, kind, and size of the fish caught. The information available on these points, as on many others in connection with fisheries, is not only very imperfect, being derived almost solely from empirical and haphazard observations, but it has never yet been systematised and co-ordinated."

"It is now well-known that the eggs of most of our edible fishes float at or near the surface of the sea, and we also know that small immature fish are found associated with the adults in their particular habitat. But we are as yet extremely ignorant as to the various stages and events between the newly hatched fish and the immature forms captured by the ordinary operations of fishing. It is very desirable that every effort should be made to increase our knowledge on this point.

"In every inquiry which has been held on fishery questions the absence of information as to the movements and general habits of fish has proved a serious obstacle in the way of arriving at satisfactory conclusions. As is well known, the productiveness and yield of the fisheries varies very much in different seasons, and as a consequence of these fluctuations both the fishermen and in many respects the public are made to suffer. It is almost a proverb that the result of any particular fishery is a lottery and depends upon chance or luck.

"What knowledge we possess as to the nature of the chief fishing grounds, the habits of particular fish, and other important matters, is almost entirely based on the empirical observations of fishermen. Long experience has no doubt taught them in rough and ready fashion the best places to set their nets or cast their lines, and the most appropriate times of doing so; but they are too often out in their reckoning, and there can be no doubt that the systematic investigation of the various fishing grounds around the coast in relation to the abundance and habits of the fish and the physical conditions which influence them, will help to throw light upon the causes of the great fluctuations which occur, and in many ways to aid in the practical improvement of the fisheries. The relations subsisting between the various organisms in the sea are hidden from the eye, and hence their investigation requires to be systematic and prolonged. But a reference to the records of the work already accomplished by the 'Garland' will show how our information on the distribution of fish, their relative abundance and rates of increase in particular areas and at different times of the year; their migratory movements, spawning periods, and the nature of their food is being extended. The data already collected are as yet not extensive enough to justify the expression of decided opinions on matters open to the exercise or disturbing action of so many influences. It has, however, been shown, from the analysis of the information acquired, that wide differences exist as to the relative distribution of our edible fishes, and especially of the flat-fishes, even in districts so closely contiguous as the Firth of Forth and St. Andrew's Bay. A study of the causes of these differences might form a valuable guide in the institution of measures for the increased propagation of flat-fishes on a large scale. There is distinct evidence also that a migratory movement of greater or less extent takes place in winter in the case of plaice, lemon sole, and dab, and this migration appears to affect the small as well as the large individuals."

"Besides the biological study of fisheries it is essential to carry on inquiries into the changing physical conditions of the waters around the coast. It is well known that variations in the temperature and salinity of the sea, and the influence of currents and weather conditions operate in many ways on the movements and habits of fish. We have partly referred to what has been done on this head. Besides the assistance of those who have made marine physics a special study, regular physical observations are carried on by the 'Garland' and at the Board's Marine Station in St. Andrew's Bay. The influence of the wind in producing ebbulatory currents in the waters adjoining the coast and in thus leading to the changes in the distribution of temperature and salinity, and to the transport of organisms from the inshore to the offshore waters, and vice versa, has not hitherto received the attention it deserves. We therefore recommend the collection of fuller data on this subject, which is intimately connected with the distribution of the food and with the movements of shoals of fish. The conditions of the weather and the influence of sunshine and darkness in shallow waters have also a direct bearing upon the movement of fish, and the information being gradually accumulated on these subjects will eventually clear up many points hitherto obscure.

"Finally, by carrying on a series of careful and comparative experiments on board the 'Garland' as to the influence of the trawl and hook in the destruction of immature fish, by correlating the information thus acquired with the data above referred to, respecting the condition of maturity, definite evidence on this practical point will be obtained. By continuing and extending the trawling experiments in the inshore waters of the protected areas, and further out where no restriction exists, the evidence in regard to the influence of this method of fishing upon the future productiveness of our fisheries will be greatly strengthened. It is obvious that, in a matter of such wide importance and so liable to accidental disturbances, it is essential that the information should be very weighty and complete before a permanent judgment is passed."

EXTRACTS.—REPORT ON THE TRAWLING EXPERIMENTS OF THE "Garland," &c., by
J. C. EVART, M.D., REGIUS PROFESSOR OF NATURAL HISTORY, &c.; and Sir
JAMES RAMSAY-GIBSON-MANTLAND, Bart.

"One of the primary objects was to ascertain, in something like a definite way, what influence the prevention of trawling might have upon the productiveness of the fisheries in certain waters protected from this mode of fishing. For this purpose trawling was prohibited in certain areas, and certain localities or stations were selected for periodic examination by the 'Garland.' By this means a large amount of statistical information has been obtained which is fully discussed below. The data supplied by the 'Garland' have the great advantage of accuracy, and hence have a high value in the formation of conclusions. But it was desirable to utilise every collateral source of information which might supplement the observations made by the 'Garland,' and also at the same time furnish important data relating to the fisheries generally. Hence steps were taken to obtain statistics of the amounts of the various kinds of fish landed throughout the year along the East Coast, by line fishermen and by trawlers, and in some cases comparative detailed returns for a few years. A system was also organized by which a number of East Coast fishing boats were enabled to keep daily records of their catches, with particulars as to size, fishing ground, &c."

"In addition to the elucidation of the practical questions connected with trawling and the collection of statistical information about the fisheries, it has not been lost sight of that the investigations of the 'Garland' into the fauna and physical conditions of the waters around the coasts would gradually extend our knowledge of the distribution, migrations, and life-history of our fishes. In dealing with these matters, about which so little is known, it is essential to success that the data should be numerous and extending over a period of years."

"A fundamental motive in the institution of the trawling experiments was to ascertain what effect this mode of fishing was likely to have upon the ultimate productiveness of the waters around the coasts of Scotland, and especially in the territorial waters. Several Government inquiries have been held at various times with this object in view, but the conclusions arrived at have not always been in strict accord. The chief reason for this divergence of opinion was the almost total absence of anything like complete or trustworthy statistics, a difficulty in the way of adequate inquiry which has been recognised, and deplored by successive Commissions. Hitherto oral testimony had to be chiefly relied upon, but the scope and drift of such evidence necessarily varies from the influence of many causes, and can never alone form a safe basis for a satisfactory judgment."

"From what has been said it is evident that the investigations will require to be much more extensive before definite conclusions can be reached, for the movements of fish, apart from any settled periodic migrations, are very erratic from day to day, and vary with the changing physical conditions. Hence, it is necessary to eliminate accidental disturbances, and this can only be done by the collection and study of a great array of statistics."

"It is, however, by studying the proportional abundance of the small and large fish of each species at different seasons, that, so far as statistics are concerned, much light will be thrown upon their migrations and their reproductive periods."

"By the systematic collection of scientific statistics regarding the productiveness of our fisheries and the relative influence of special modes of fishing, the movements of distribution, the spawning processes, and general life-history of the fishes themselves, a great deal will be accomplished for the promotion of the fishery industries of Scotland. In this connection it will be seen that the investigations carried on by the 'Garland' are calculated to have a high value, since the data thus collected are wide in their scope, systematic, and trustworthy,—and can only be obtained by the use of a vessel specially adapted for the purpose."

"The most immediately important subject that has here to be considered, in the light of the knowledge acquired, is that of the influence of trawling upon the general productiveness of our fisheries, more particularly in regard to those which are carried on in partially enclosed areas and in territorial waters. There are other aspects of this question of practical interest and importance, which have been discussed in a Special Report to the Secretary for Scotland. An examination of the results of the 'Garland's' investigations, set forth in the body of this Report, make it clear that the suspension of trawling has been followed by a great increase in the numbers of the fish with π the waters of the protected areas, both in the Firth of Forth and in St. Andrew's Bay, the two districts in relation to which the statistics are most extensive and complete. This increase has been shared by the round fish as well as by the flat; but, as was naturally to be expected, the augmentation has been proportionately far greater in the case of the less migratory flat fish."

"The investigations, so far as they have gone, suggest a more careful regulation of the various modes of fishing in the territorial waters; that in fact the inshore waters have a distinctive character, and if properly cultivated might become of very great national importance and value, and be the means of supplying not only immense quantities of round and flat fish, and of mussels, lobsters, and other shell fish, but, in addition, help greatly in maintaining and improving the yield of all the waters around the coast. Nature's law seems to be that the richer any given piece of water becomes—that as the less migratory inshore forms increase,—the migratory forms will all the more seek and longer remain in the inshore waters."

EXTRACTS from the REPORT of a COMMITTEE of the FISHERY BOARD for Scotland, &c., 10th April, 1888.

"Unfortunately the evidence obtained from fishermen and others was in most cases similar to that submitted to the Trawling Commission which reported in 1885, and the delegates from the various fishing stations had no new facts worthy of consideration to submit. The fishermen, as a rule, seem to have made up their minds that certain modes of fishing are injurious, and although at another, they were always firmly adhered to, the fishermen being unwilling to give weight to any considerations which failed to accord with their opinions. For example, the seine net fisherman of Campbeltown insist on the great injury done by the trammel net fishermen who work on the Ballantrae banks, while the Ballantrae fishermen believe that the use of seine nets on the banks is ruining the herring fishing. Again, many of the Loch Fyne fishermen are anxious to put a stop to the winter Ballantrae fishing, which naturally the Ballantrae and Gairran fishermen decidedly object to. In the same way the line fishermen on the east coast are practically unanimous in favour of prohibiting the large beam trawlers from working in any portion of the territorial waters on the east coast during any month of the year, but many of them see no harm in killing immense numbers of small immature fish with the hook and line, while they rightly protest against the use of the small beam trawls and otter and bag-nets, which in Aberdeen Bay and elsewhere are the means of destroying immense numbers of young round and flat fish.

"This being the case, it has been necessary, while paying due attention to the opinions of the fishermen, to give special weight to the statistics recently collected, and to the results of the trawling experiments—results necessarily still extremely limited, for as the work only began in 1886, we have only two seasons' observations at command, which at the best yield rather limited data for any far-reaching conclusions."

"It is everywhere alleged that the territorial waters have been overfished, but in the absence of statistics it is impossible in the meantime to arrive at any definite conclusion on the subject. That there is no general exhaustion of the inshore and offshore waters around the coast may be inferred from the fact that nearly double the quantity of round fish (exclusive of herring) was landed in 1887 than in 1882, and that at Stonehaven and other centres, where trawling is not prohibited by the bye-laws, more fish were landed in 1887 than in former years. It is too soon to claim the improvement which has taken place in the 'takes' of both line and trawl fishermen as a result of protecting certain inshore waters. It may afterwards be shown, however, that inshore grounds can be exhausted by either line or beam trawl fishermen, the rate and extent depending on the number and size of boats fishing. The 'Garland' statistics show that flat fish have increased in the Forth since trawling was prohibited, while in the Clyde they are less abundant than in the Forth, and are apparently diminishing. Should it appear that overfishing is exhausting a bank, further investigations may prove that a short period of rest may restore it to its natural productivity."

"Immature fish are destroyed in great numbers."

"Information on the effects produced by the sole rope of a trawl net on spawn, spawning beds, and feeding ground, is as yet incomplete. Many facts have been established, many remain to be ascertained. It is now known (although many of the fishermen still assert the opposite) that the spawn of most food fishes floats near the surface; this the trawl cannot hurt. That of the herring, on the contrary, lies on the bottom, and is exposed not only to direct injury, but to a still more probable means of destruction, that of being swept from its carefully selected resting place to some other, where unfavourable conditions may render development impossible. The effects produced by the sole rope passing over spawning beds or feeding grounds cannot be easily determined, but the experiments hitherto carried on by the Board seem to show that little damage is thus caused, and it is notorious that herring are extremely abundant all round our coasts.

"Fish may be, and probably are, scared by a passing trawl, but it would be too much to found on this probability a belief that trawling drives them permanently, or even temporarily, from a favoured resting place.

"Steam trawlers when getting good hauls often put down buoys, and trawl round and about them for days at a time. It is, of course, impossible to tell how many of the fish in such spots are caught, and how many scared away, but clearly the first appearance of the trawlers does not produce a general exodus."

"On the other hand, the 'Garland' has shown, that when the trawl is carried over a shallow bank during the day, only a few small flat-fish may be taken, owing to the fish rising and avoiding the net, while by night the same ground may yield a large number of both flat and round fish. On one occasion no fish at all were taken during the day, while the same ground yielded during the night 1,044 fish (about half of which were round).

"In respect to the breaking up of herring shoals, or divergence from their courses, it is conceivable a fleet of trawlers may at times have some influence."

"From the evidence given in support of beam trawling, it appears that a very large proportion of the round and flat fish consumed fresh are landed by beam trawlers (about 180,000 cwts. in 1887, in Scotland, and fish to the value of about £3,000,000 in England), and that a considerable proportion of the trawled fish are captured in or near the territorial waters, and further, that where trawling is absolutely prohibited in the territorial waters, not only would the markets suffer, but large numbers of valuable flat fish, seldom taken by line fishermen, would escape capture, and remain inshore feeding on herring spawn and young fish. The beam trawlers would apparently be satisfied if allowed to fish certain inshore banks during certain seasons of the year. If this be so, there need be no great difficulty in making regulations that would give satisfaction to both line and trawl fishermen, without in any way seriously interfering with the regular supply of fresh fish."

"In the Board's Fifth Report for 1885, it is stated that 'the evidence already collected seems to indicate that by regulating beam trawling in territorial waters they will, in course of time, yield more mature fish, and serve as nurseries and feeding grounds, during certain months, for schools of herring, haddock, and other valuable fish.'

"This expectation has been to a certain extent verified. From the Board's officers, from the fishermen, and from the results of the experimental trawling by the 'Garland,' there appears as the result of prohibiting beam trawling, an increase in the number of flat fish both in the Firth of Forth and St. Andrew's Bay; while in Aberdeen Bay, since the restriction was removed, the round fishing has been extremely successful. A large increase in round and flat fish is reported from Steneshaven, which cannot well be accounted for by the restriction of trawling in St. Andrew's Bay—the nearest closed area.

"The totals taken from the 'Garland's' work are instructive.

<i>In the Firth of Forth.</i>				
Year.	Round fish.	Flat fish.	Gross total.	Average per shot.
1885,	3,115	2,795	5,911	219
1887,	4,764	6,120	10,880	330
<i>In St. Andrew's Bay.</i>				
1885,	646	3,538	3,183	175·8
1887,	3,126	6,077	8,203	410·1

"In both cases the increase in number was due to increase in small fish, of which the line fishermen also take largely increased numbers.

"It appears that 200, 400, and 500 small fish on separate occasions in 1886 were captured at one shot by the 'Garland,' the majority in some cases being as small as four inches in length. There is a chance of these small flat fish snuffing from the comparatively small mouth of the 'Garland' trawl net, but little or no chance of their escaping from the large net of the steam trawlers, should they happen to be feeding or resting in its course. If the 'Garland' captures immense numbers of small fish, the numbers increasing in the ratio of its proximity to the shore, it must be inferred that still larger numbers would be destroyed by the large trawlers. While the 'Garland' returns show a great increase of small flat fish they show only a slight increase of large flat fish. This seems to bear out the following inferences:—(1) that the inshore grounds serve as resorts for young and growing fish; and (2) that flat fish are very limited in their migrations—a bank, when once exhausted, not being immediately restocked from the open sea or even from adjacent banks—having, in fact, to depend largely for its restocking on the survivors that escaped capture, or on the gradual advent of young forms from the shallow water."

2.—LINE FISHERY.

"From what has already been said, it is evident that any marked continuous diminution in the supply of fish can neither be exclusively ascribed to natural causes nor to beam trawling.

"By improved communication with markets, more attention is given to fishing, more men engage in this industry, and better appliances are employed. The result appears to be a drain upon the supply of fish from the inshore waters sufficient, even without trawling, to cause diminution.

"That this is so may be seen from the Report of the Royal Commission of 1885, where there appear replies to queries addressed to Foreign Governments. Norway, Sweden, and America tell of diminished supplies of fish, though beam trawling is unknown; Denmark, Germany, and France practically exclude trawlers from their territorial waters, yet fish are fewer than in the past; the Netherlands and Belgium apparently depend for fish principally on trawling. In France steam trawlers are only employed to a very limited extent, and not at all in Belgium or the Netherlands. A decrease of fish and incomes of fishermen, are reported from most of the countries named. On the Scottish coast, the decrease in the individual takes of fish seems related to an increase of fishermen, as much as to the introduction of beam trawling. By the trawl and hook fish of all kinds and all sizes have been taken from our seas, immature, spent, and useless fish unfit for human food, as freely as mature and valuable. Much is said, and no doubt justly, of the destruction wrought by trawlers on immature fish, but line fishermen are, at least, equally in fault."

"If the inshore waters are not to be exhausted, further investigations may show that the line fishermen equally with beam trawlers should be as far as possible prevented from continuing to destroy immense numbers of young and immature fish.

"What is most needed in the meantime is that the Board should be in a position that will admit of the known fishing grounds being thoroughly surveyed, both inshore and offshore; that the migration of fish should be as far as possible determined, and charts prepared showing the various areas where trawling might, during at least certain seasons of the year, be advantageously carried on. The reasonableness of this will be readily granted. In some districts the fishermen seem to welcome the trawlers, believing, it may be rightly, that in capturing certain kinds of fish, the trawlers tend to increase rather than diminish the supply of others. It is admitted on all hands that there are numerous banks on the east coast frequented by lemon sole, and that there are others in the Clyde estuary which form the feeding grounds of black sole, two kinds of fish which are only on extremely rare occasions taken by the line fishermen."

RECOMMENDATIONS.

"A glance through this Report shows how many, intricate and difficult are the questions connected with sea fisheries, how utterly impossible it is that each, as it comes to the front, can be dealt with by a separate Act of Parliament. To perpetual and conflicting legislation there are but

two alternatives; free fishing, wasteful, destructive, and likely to reduce those who draw their living from the sea to destitution, and the food of the entire people to its minimum quantity; or the fullest powers in the hands of those entrusted with the care of sea fisheries. No nation now permits unrestricted fishing; science, practical knowledge, and experience forbid it. But with the evidence already collected we are far from justified in recommending that trawling should be absolutely prohibited in the territorial waters, and yet it may seem imperative, in the interests of the fishermen and the economical management of the fisheries, that facilities should exist for preventing trawling and other modes of fishing in certain districts during certain seasons of the year."

"We also recommend that the Board consider whether any steps can be taken to prevent the capture of immature round and flat fish in the territorial waters by the line fishermen."

"In conclusion, we feel it our duty to state that the present arrangements for securing the enforcement of the bye-laws already passed are far from satisfactory, and that unless the small cutter 'Daisy' (which the Clyde and Loch Fyne fishermen allege to be absolutely useless for fishery superintendence) is superseded by a small steam cruiser, adapted for trawling and other fishery work, any attempt to regulate or prohibit beam trawling in the Clyde will be futile."

EXTRACTS FROM PRELIMINARY REPORT by SIR JAMES MANTLAND and PROFESSOR EWART re Clyde Estuary.

"From a study of the estuary, it appears to us that certain portions are very suitable for trawling, and the Campbeltown evidence points to the existence of banks where black soles were abundant, though now, through over trawling, they are nearly exhausted. It appears probable that large numbers of both round and flat fish spawn all over the estuary. Apparently the local trawlers have done comparatively little harm, and the complaints against them, although of long standing, are very slight. On the other hand, it seems that a large number of English trawlers have been at work for several months in the estuary, and while practically giving a close time to certain portions of the English coast, they were exhausting the Clyde estuary, and at the same time often carrying away or greatly injuring the lines and nets of the local fishermen. It should, however, be stated that off Aline Craig the English trawlers obtained considerable takes of black sole, a fish which had never been taken in any numbers by even the local trawlers. The damage to nets and lines by trawlers in an enclosed area like the Firth of Clyde, seems to be sufficient to deter the line boats from fishing. And further, if large English trawlers are allowed to work in the estuary for two or more consecutive seasons, there is a great probability that the fishing grounds will be so exhausted that the number of line boats will sensibly decrease, and when beam trawling ceases to pay, or when more profitable grounds are discovered elsewhere, the local supply of fish will be considerably diminished."

"After fully considering the whole question of beam trawling, we beg to recommend that the Board should proceed to regulate beam trawling in the Clyde estuary within a line extending from the Moll of Corryvreckan to Corneval Point on the Wighamside coast. We do not feel justified in suggesting that trawling should be absolutely prohibited in all parts of the estuary throughout the year. It is extremely desirable that the valuable black sole and other flat fish not easily captured by line fishermen, should reach the market, hence we suggest to the Board the propriety of making arrangements which would admit of beam trawlers during certain months of the year, under necessary restrictions, working over the grounds frequented by sole, turbot, &c."

EXTRACT FROM FURTHER REPORT re Clyde Estuary, by PROFESSOR EWART.

"It becomes an important question to consider what the ultimate effect may be of such an amount of trawling in an enclosed area like the Clyde estuary, especially in relation to the future supply of the important flat-fishes. It can scarcely be doubted that the more active and wandering fish, like the cod and haddock, although they may spawn within the limits of the estuary, have their males largely recruited by additions from the waters outside; and hence a diminution in the supply of such round-fish in a particular locality may often be for this reason only more or less temporary. But with the flat-fish it is probably different. We are as yet but imperfectly acquainted with the migratory movements of fish, or with the conditions which determine such movements; but from the conformation and habits of flat-fish, and from other evidence, it is exceedingly probable that their migrations are much more limited than in the case with round-fish, and that consequently the effects of excessive fishing in a particular area may cripple the yield of that area for several seasons, and if continued uncontrolled, may result in the practical destruction of its productiveness for a considerable period. It seems to be the general opinion of the local trawlers on the Clyde, that since the best takes of black sole and turbot are got from the end of August to the beginning of the New Year, the soles migrate into deeper water about Christmas, and begin to return about the end of March, passing up Killybegs Sound as far as Corneval Bay. But it is quite as probable that they only seek themselves to the inshore waters, where, from the richness of the ground, the trawlers cannot follow them, and that they may spawn there without leaving the estuary at all."

"It must be recollected that, from the nature of trawling, and the habits of the fish, flat-fish will be taken in greater numbers than round-fish; in proportion to their relative abundance in the sea, the latter, owing to their more active habits, having a better chance of escape. It would be very important in this connection if we had accurate statistics or reliable data in regard to the

amount of flat-fish now taken, compared with what it was before trawling became common. On this subject the evidence of the local fishermen goes to show that considerable diminution has occurred. The opinion was very generally expressed that the catch of turbot and other valuable fishes of this class was very much less than before the trawler appeared; and it seems that new trawlers often get only one or two pairs of soles in a trawl, although they say they occasionally get as much as 5 cwt. We feel very strongly that such questions connected with the relative influence of various modes of fishing upon the productiveness of any given area, and upon the ultimate effect likely to be produced, should be, so far as possible, based upon accurate statistics and trustworthy data, and not entirely upon the local evidence of those engaged in fishery pursuits. Such testimony can scarcely ever be free from bias or prejudice; it depends upon memory or tradition, and is often divergent or contradictory; and at the best it lacks those elements of precision and exactitude upon which alone a satisfactory judgment can be based."

"Now these figures relate to fairly equal catches, at the same season of the year, in two extensive areas, one of which is closed while the other is open and unrestricted. The great variation in the relative abundance of flat-fish in the Forth and the Clyde can scarcely be due to physical differences. It seems rather to show that it is to a large extent owing to restriction and non-restriction, and that continued trawling in a confined area tends to cause diminution in the abundance of flat-fish beyond their powers of natural reproduction."

"But while all the evidence accessible seems to point to this conclusion, it can scarcely be held to be yet complete and extensive enough to warrant the recommendation of any sweeping measures which might tend to paralyse an important branch of the fishery industry on the West Coast. By the very nature of the problems underlying such questions connected with the fisheries, certainty can only come through a continuous and extensive series of investigations, since it is only by such means that what may be accidental and temporary can be distinguished from what is fundamental and sensitive. It is not, therefore, desirable at present to attempt to prevent trawling in the Clyde estuary generally, but sufficient evidence exists to justify some degree of restriction during certain periods of the year. Perhaps it may be found that in the meantime the best course to follow will be to arrange to make systematic observations in certain limited portions of the Clyde area, at points where trawling is permitted and also where it may be prohibited, so that comparison may be made between them, and definite conclusions reached."

APPENDIX No. 2.

EXTRACTS FROM THE STATEMENT BY THE SCIENTIFIC REPORT COMMITTEE OF THE Fishery Board for Scotland, on the Scientific Work carried on during the Six Months—April to October, 1888.

The Trawling Experiments.

"The nine stations in the Firth of Forth and those in St. Andrew's Bay have been examined periodically. The stations in the Moray Firth and in Aberdeen Bay have also been examined, and three new stations have been formed on the East Coast, one at Orkney Bay and two in Montrose Bay, where steam beam trawlers have recently 'cleared up' the ground, and according to the testimony of local trawlers who consistently refrain from trawling in the territorial waters of Montrose Bay, have destroyed large numbers of the immature flat fish which frequent the inshore waters. The 'Garland' returns, relating to the Forth and St. Andrew's Bay, have not as yet been completed; but the line fishermen have been getting larger catches this year in the protected waters of the Firth of Forth and St. Andrew's Bay than they have ever done since statistics began to be collected. This increase on the amounts landed by the line fishermen relates to all the edible fishes, and is especially noticeable in the case of haddocks and dot fish. When the periods from February to September, inclusive, are compared, it is shown that the line fishermen have got more than 20 per cent. of an increase this year over 1887."

Immature and Mature Fish.

"The determination of maturity and immaturity in relation to size, a point so important with regard to legislation, is being carefully attended to, each fish being accurately measured, and the condition of the reproductive organs noted. By carrying on these inquiries throughout the spawning season, it will be possible to fix upon the limits of size which separate the immature from the mature."

The Relative Abundance of Small and Adult Fish in Inshore and Offshore Waters.

"We have felt it desirable to obtain accurate information in regard to the relative distribution of immature and mature fishes. Special bee-line trawlings are being carried on from the shore out to the offshore waters, to determine the proportions of immature fish in the territorial and extra-territorial waters. A fine-meshed trawl is also being used for this purpose."

The Spawning of Fishes.

"The inquiries into the spawning periods of the fishes are going on concurrently with the inquiries into their food, above 3,000 specimens having been examined. The vast majority have as yet been found immature, but cases have occurred of ripe fish being found among common dab, lemon dab, plaice, and gurnard, indicating not the normal spawning period but exceptional cases."

In connexion with these inquiries we have directed that special care be taken to preserve and examine all tow-net gatherings, so that the occurrence of floating ova or fry may be brought into relationship with the results of the examination of the adults; and a new very fine-meshed trawl-net, to fit the ten feet beam recently provided, has been made for the special purpose of capturing very young fish. Specimens of the milt and roe of the various species are being prepared for microscopic examination at the Natural History Department of Edinburgh University."

The Migration of Fishes.

"In regard to the important point of migration, much is being learned by a comparison of the traveling experiments; but, since a long marine estuary like the Firth of Forth, is singularly well adapted for more accurate experiments, an instrument has been devised to rapidly stamp small aluminium labels with the number of the station, the date, and a distinctive number, so that some 200 or 300 fishes may be labelled and set free monthly at very small expense. By this means, not only the migrations which determine the movements of the shoals may be investigated, but the rate of growth of the fish may be decided."

APPENDIX No. 2.

EXTRACTS FROM Letter from the RESIDENT DIRECTOR of the MARINE BIOLOGICAL ASSOCIATION of the UNITED KINGDOM, dated 7th January, 1889,—taken from *The Times* of 9th January, 1889.

Sea Fisheries.

"The association was founded for the purpose of making the very investigations demanded by Mr. Carter, and that its laboratory at Plymouth, completed and opened, as was recorded in your columns, in June last, affords every facility for conducting experiments and observations on marine fishes. The permanent staff of the association is directed to devote its interest to fishery questions, and the forthcoming number of the journal of the association, which will be issued during the present month, will show that substantial progress has already been made. Unfortunately the resources of the association are limited, and funds are urgently needed both to complete its equipment by the purchase of a steamboat and to employ more investigators.

"Marine pisciculture is one of the most important projects of the association. Mr. Cunningham, the resident naturalist at Plymouth, is devoting his time to this subject, and a paper from his pen, now in the press, will show what possibilities have been opened up by preliminary investigations."

"The old and erroneous statement that man is doing more destruction by destroying spawning grounds by means of inappropriate fishing engines than by over-fishing. It has long been known that the ova of an immense majority of food fishes float on the surface, where the beam trawl (which is always understood when an unfit fishing engine is mentioned) is powerless to injure them, and the herring, which does deposit its adhesive ova on the sea-bottom, invariably chooses such rocky ground that beam trawling is impossible there. It is evident, therefore, that the statement that 'man is upsetting the vital balance by destroying the spawning grounds

and removing the germs of life from their retreats' is founded on no basis of fact. Again, the destruction of immature fish is referred to, and, as usual, the destruction of young soles is particularly insisted upon. One should be cautious in accepting statements of this kind. I was told on my arrival at Plymouth that enormous numbers of young soles were destroyed by shrimp trawls in certain localities. I investigated this point, and found that nearly all of these 'soles' were young scullduff, a form which, in the young condition, requires a tolerably close scrutiny even by an experienced eye to distinguish it from a young sole. It is of no value as a food fish.

"Mr. Cunningham of the 31st ult. repeats the time honoured grievances of the drift-net against the beam-trawl fishermen. The antagonism between these two classes of fishermen is universal, but I have yet to learn that beam trawling is the cause of such wholesale destruction as is stated. The trawling grounds are limited as compared with those on which drifting is impossible, and these limited areas are fished over so continually that it is not wonderful that they should be depopulated by constant disturbance; but the surrounding rougher grounds remain untouched, and the balance of nature is scarcely affected. As for the diminution of such migratory fish as herring, pilchard, and mackerel, there is no evidence to support it. The number of these fish taken by man may seem to be enormous, but it is insignificant compared to their destruction by their natural enemies; and it may be observed that man—Mr. _____ seems to put man altogether outside the pale of nature—redresses the balance by destroying a proportional number of these enemies—cod, hake, dogfish, &c.,—which pursue and prey upon the shoals of migratory fish."